



U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

DOT HS 807 139

May 1987

Final Report

Health Risk Appraisal and Safety Belt Use

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1. Report No. DOT HS 807 139		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Health Risk Appraisal and Safety Belt Use - Final Report				5. Report Date May 1987	
				6. Performing Organization Code	
7. Author(s) David D. Perkins and Sabina M. Dunton				8. Performing Organization Report No.	
9. Performing Organization Name and Address JHK & Associates Well Aware About Health 120 W. Broadway, Suite 364 834 Camino De Fray Marcos Tucson, Arizona 85701 Tucson, Arizona 85718				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No. DTNH22-85-C-07150	
12. Sponsoring Agency Name and Address National Highway Traffic Safety Administration Office of Driver and Pedestrian Research NRD-40 400 7th Street, S.W. Washington, D.C. 20590				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes John Eberhard, COTR					
16. Abstract <p>The primary objective of this study was to determine the effectiveness of health risk appraisal (HRA) programs for increasing claimed and observed safety belt use. HRA programs were field tested with and without supplemental educational materials on safety belt use. Evaluations were performed to determine differences in safety belt use characteristics of treatment and control groups in work settings and medical settings in four states.</p> <p>Health risk appraisal is a method for ascertaining the probabilities of being at risk for a particular cause of death and for assessing an individual's future prospects for good or ill health. The information and recommendations from HRA help individuals identify modifiable health risks and provide recommendations for reducing certain health risks.</p> <p>Educational materials were developed in this study to supplement HRA programs on the subject of safety belts. The package, referred to as The Great American Habit Plan (GAHP), combined selected educational materials and messages using the fundamentals of behavior change theory. The primary purpose of the GAHP was to increase the potential for HRA programs to effect positive changes in the safety belt use behavior of an individual.</p> <p>The analysis produced several strong findings that support the hypothesis that HRA programs are capable of producing a positive behavior change related to the use of safety belts. Also, the educational materials and the concepts used in their development, were considered by HRA program providers to be highly useful as a complement to information currently presented in HRA programs.</p> <p>The report will be of interest to safety program providers, administrators, and researchers in the traffic safety field, and to HRA vendors, program providers, and researchers in the public health education field.</p>					
17. Key Words Health Risk Appraisal, Safety Belts, Safety Belt Programs, Safety Belt Use, Occupant Protection, Motor Vehicle Safety, Health Promotion.			18. Distribution Statement Document is available to U.S. public through the National Technical Information Service Springfield, Virginia 22161		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	22. Price

ACKNOWLEDGMENTS

The Co-Principal Investigators of this research study wish to acknowledge the following individuals for their participation and assistance in the study.

Dr. David Sleet, San Diego State University

Mr. Rick McNeely, Well Aware About Health

Mr. David Fischer, Graphical Illustrator

Dr. Robert Kuehl, University of Arizona

Ms. Pat Kane, Winnebago County Health Department

Mr. James McDonald and Ms. Stephanie Sharp, Pennsylvania Department
of Health

Mr. Steve Foltz, CIGNA Health Plan of Arizona

Ms. Susan Wellborn, CIGNA Health Plan of California

Dr. John Eberhard served as the Contracting Officers Technical Representative for the National Highway Traffic Safety Administration.

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1. INTRODUCTION

The purpose of this research study was to examine the role of health risk appraisal (HRA) and supplemental education materials on observed and claimed safety belt use. Educational materials were developed in this study which utilized existing traffic safety messages and materials, and the fundamentals of behavior change theory. This theory serves as the foundation of health risk appraisal programs. This package of educational materials was called, "The Great American Habit Plan." Field tests were conducted to determine the extent to which HRA programs, with and without the educational materials developed in this study, influence observed and self-reported safety belt use by participants of HRA programs.

RATIONALE FOR THE STUDY

Operational experience and research on the effectiveness of HRA and safety belt educational/informational programs provide the rationale for this study. Even though HRA is a relatively new practice within the public health field, a number of studies have shown positive results in changing safety belt use patterns through HRA. Studies on the effectiveness of HRA indicate improvements in self-reported safety belt use up to 23 percent. From another perspective, traffic safety programs that provide education, information, incentives, and policies to promote safety belt use have been shown to be highly effective within business, medical, or community settings. The literature suggests that safety belt use rates of up to 90 percent can be achieved through a combination of approaches applied within safety programs (Geller, 1982, 1983, 1984, 1986 and Campbell 1983, 1984).

Other issues that contribute to the rationale for the study relate to current legislation mandating safety belt use and to research needs related to traffic safety and HRA programs. The issues are summarized below:

- o Information is needed on the relative effectiveness of health risk appraisal within both mandatory and voluntary safety belt use settings. This information would provide an indication of the need to pursue health risk appraisal concepts as a method of obtaining increases in safety belt use above those levels that are attainable through mandatory safety belt legislation and also the effectiveness of health risk appraisal in states where voluntary safety belt use will continue.

- o Studies on the effectiveness of mandatory safety belt laws indicate that continuing education and enforcement are necessary to maintain initial (post-law) safety belt use rates. This finding suggests that efforts to develop innovative educational materials and techniques should continue and be administered in conjunction with legislative activities.
- o Research is needed to determine the effectiveness of "personalizing" information related to the use of safety belts. Health risk appraisal is intended to promote positive behavior changes on a "personal level." Information is needed on the extent to which personalized information can achieve increases in safety belt use as compared to promotional or programmatic approaches.
- o All states may not enact mandatory safety belt laws and others may in time elect to discontinue or deemphasize such legislation. Information is needed on the effectiveness of health risk appraisal to promote safety belt use in voluntary settings.
- o Studies conducted to evaluate the effectiveness of health risk appraisal on increased safety belt use have been based entirely on self-reported safety belt use. There is a need to verify the effectiveness of health risk appraisal through observational studies of actual safety belt use behavior.
- o Safety issues such as those related to motor vehicle and safety belt use receive less emphasis in current health risk appraisals than other medical and health components due primarily to the fact that appraisals are given within the medical/health care community. There is a need to provide health risk appraisal program providers with additional safety information and materials on motor vehicle and safety belt issues.

The primary hypothesis of this study is that current HRA programs, when enhanced with supplemental materials on safety belt use, can produce significant increases in safety belt use when directed toward specific target groups within defined settings.

STUDY OBJECTIVES

The primary objective of the research is to determine the effectiveness of HRA programs and associated educational/motivational materials for increasing claimed and observed safety belt use. The following corollary objectives were established for this study.

- o Develop educational materials for use in existing HRA programs using methods, messages, and approaches determined to be effective from past research.

- o Conduct HRA programs with and without the educational materials on safety belt use for target groups with the highest probability for increased safety belt use.
- o Evaluate the effectiveness of HRA with and without the educational materials based on observed safety belt use using a control-type experimental plan. Effectiveness should be assessed in work and medical settings within states with and without mandatory safety belt use laws.

Achievement of the research objectives are intended to provide traffic safety professionals and public health officials with valuable insights on the utility and effectiveness of HRA programs and supplemental educational materials on safety belt use.

DEFINITION AND HISTORICAL PERSPECTIVE OF HRA

Health risk appraisal (HRA) is a system for estimating an individual's risk of death and makes calculated recommendations to improve survival odds. HRA is used in the practice of prospective medicine as a tool to help individuals recognize personal health risks, understand how risks affect their overall well-being, and encourage the pursuit of a healthy lifestyle. The theory of HRA is that people can modify hazardous behaviors and reduce the probabilities of developing disorders that could cause death within a subsequent 10-year period (Ratcliff, 1978).

Health risk appraisal is a method for ascertaining the probabilities or odds of being "at risk" for a particular cause of death and for assessing an individual's future "prospects" for good or ill health. The information and recommendations from HRA help individuals identify modifiable health risks and provide an "intervention prescription" that suggests specific ways by which individuals can reduce certain risks to their health.

The first attempt to estimate mortality (death) risk quantitatively in an HRA was made by Lewis Robbins, M.D., and Jack Hall, M.D., at the Methodist Hospital of Indiana. Their health risk appraisal, called "Health Hazard Appraisal," was published originally in 1970 in their book, "How To Practice Prospective Medicine" (Robbins, Hall, 1970). It remains the basis for most quantitative health risk appraisal tools available today. Robbins and Hall suggested that each disease or injury contracted by an individual progresses through six stages:

1. The individual is not at risk.
2. The individual is vulnerable to a precursor and, therefore, is at risk.
3. A precursor is present.
4. Signs of disease are present.
5. Symptoms are present.
6. Disability occurs.

Health risk appraisal can identify an individual's potential for death (and by inference, for disability and injury) as early as Stages 2 and 3 of this progression, that is, even before signs or symptoms are present.

HRA was originally developed for use by physicians as a means of extending the utility of the patient information and history form. Since the mid-1970's, HRA has also been used by "wellness" professionals as a motivational tool to personalize health information and encourage lifestyle change conducive to health.

For additional information on HRA, the following publications are recommended.

- o "Health Hazard Appraisal, Clues to a Healthier Lifestyle," by Lydia Ratcliff, Public Affairs Pamphlet No. 558, Public Affairs Committee, Inc., 1978.
- o Promoting Health, Vol. 2, No. 4, by the American Hospital Association, July-August, 1981.
- o "Health Risk Assessment in Health Program Evaluation," Baseline, Volume 1, No. 8, Health Services Research Center, University of North Carolina at Chapel Hill, September, 1984.

HRA Program Components

Most health risk appraisal programs have similar components. They usually consist of a questionnaire or survey instrument, a means of analyzing or scoring the information (usually computerized), and a report that summarizes individual risk and how risks can be reduced. Each component is described in the following sections.

Questionnaire

The questionnaire asks an individual for personal facts that directly relate to factors that contribute to health risk. In addition to age, sex, and ethnicity, it gathers the following types of information:

- o Lifestyle habits/practices such as smoking, drinking, exercising, and use of safety belts.
- o Physical measurements such as height, weight, blood pressure, and blood tests.
- o Health care practices such as having a regular pap test or rectal examination, and doing breast self-examination.
- o Personal and family medical history including heart problems, diabetes, suicide, and cancer.

This information is collected through the use of a printed questionnaire, a personal interview, or an interactive computer terminal.

More sophisticated HRA's allow for the entry of more extensive physical measurements and additional clinical tests. These expanded HRA data collection instruments may also serve as medical screening devices. Some instruments gather additional information on lifestyles, nutritional habits, stress, life contentment, occupation, and environmental factors. These may be associated with the onset of disease, injury, or disability but have not yet been established as causes of death. Morbidity information is obtained in some HRA's so that quality-of-life issues relating to illness rather than death, can be discussed in narrative fashion.

Scoring or Analysis

The questionnaire data obtained for each individual are analyzed by hand or processed by computer and compared with a national mortality data base to obtain measures of risk. Risk assessments are based on algorithms matching individual behavior, demographic, and physiological data to mortality rates, relative risks, and disease prevalence data obtained from epidemiologic studies. Mortality ratios for the leading precursors of death are converted to individual chances of dying during the next ten years and are adjusted for sex, age, and race. (Because HRA formulas use death statistics, no attempt is made to quantitatively calculate the effects of

unhealthy lifestyle behaviors on morbidity or injury risk.) This process results in a calculation of the degree to which the individual's risks deviate from the risks of the average person in that person's race-sex-age category for the various causes of death. Probabilities of death are typically converted into statements reflecting how healthy an individual is compared with others of the same age, sex, and race using the "risk age" concept.

Report on Results

Health risk appraisal results are returned to the individual in a personalized, confidential report, usually in the form of a computer printout. Overall risk is expressed for an individual in the form of a "risk age" or "health age" as it compares to chronological age. These ages are another way of expressing the risk of death per 100,000 population, a concept not usually understood by the general public. However, when converted to age, the concept is more easily understood. Depending on the individual's level of risk, "risk age" may be older (higher risk) or younger (lower risk) than a person's actual age. In addition, the potential for overall improvement is expressed as an "achievable" or "compliance" age, which represents a goal the person can achieve by complying with the various health risk-reducing recommendations. Achievable age represents the optimum risk for a person assuming they improve all their modifiable health risks. Most reports also rank probable causes of death in order of significance to the individual. Also, some reports indicate the percent or proportion that each cause contributes to the person's overall risk.

Recommended changes in behavior to decrease risks related to specific causes of death are indicated in feedback materials. The impact of changed behaviors is shown by reduced chances of dying. Some HRA instruments use graphics on risk, color, and clever explanatory descriptions to present these personal data more clearly and understandably.

HRA Programs

Health risk appraisals are generally one component of a health education program. A typical health program with an HRA usually has the following components:

- o **Program orientation.**
- o **Health risk questionnaire completed at an HRA screening session.**
- o **Physical screening (optional height, weight, blood pressure, and blood tests).**
- o **Results (printout) interpretation--either in a group session where results are interpreted, generally, or a one-to-one counseling interpretation session.**
- o **Follow-up personal counseling.**
- o **Referral to professionals, organizations, or programs to help modify health risks (e.g., weight reduction programs, fitness club, etc.).**
- o **Education sessions for general information about heart disease, cancer, traffic safety, exercise, nutrition, or specific behavior change programs, such as, smoking cessation, stress management, etc.**

In 1982, the Society of Prospective Medicine (SPM) published guidelines for HRA program providers to encourage high standards in the application of HRA's. The SPM guidelines are provided in Appendix A.

Statistical Basis And Interpretation

Most mortality-based health risk appraisals are based on statistical tables developed by biostatistician Harvey Geller, Ph.D., and life insurance actuary, Norman Gesner. The tables were combined to form the Geller/Gesner tables, which were originally published in the book by Robbins and Hall (1970). The Geller tables use national mortality (cause of death) statistics as the data base. The Gesner tables give the values assigned to each known contributing risk for each cause of death. The numeric values are weighted according to the degree of contributing risk (i.e., smoking two packs of cigarettes daily is weighted more than smoking one-half pack). Using these tables and the information from the HRA questionnaire, an individual's risk of dying in the next ten years from major causes of death can be estimated.

The tables are organized by two ethnic groups, black and white. Each group is divided into males and females and each sex is divided into age groups from 1 through 74 years. Data are available for categories, such as, "black female, age 30"

and "white male, age 55." Major causes of death are ranked in order of magnitude for each age-sex-race category. Also listed is the number of deaths that is expected to occur per 100,000 persons in each category within the next ten years and the percentages of those deaths that are expected to be attributable to the specific causes of death (such as, motor vehicle accidents, heart disease, various cancers, and accidents). The tables also make it possible to describe in numerical terms, the degree of risk that a given precursor represents to an individual at the time data are collected (to indicate in quantitative terms, the degree to which the person's precursors deviate from the average) and the amount of risk improvement possible.

Appendix A contains a discussion on statistical computations and the interpretation of HRA results printout. The HRA questionnaire and results printout developed by the Centers for Disease Control (CDC) form the basis for the discussion in Appendix A.

HRA Estimation of Motor Vehicle Accident Risk

To determine motor vehicle accident risk, questions about an individual's habits related to driving are asked in the HRA questionnaire. In addition to asking about the use of safety belts, there are questions on alcohol consumption, use of drugs and medications, and miles driven per year. The recent "U.S. Risk Factor Update Study" (Breslow, 1985), urges the use of the size of car as a contributor to fatality risk.

All motor vehicle accident risk information is self-reported. Although self-reported use of safety belts is usually overestimated by the respondent, infrequent or non-use of safety belts is the most prevalent modifiable health risk when HRA group data are summarized. No reference in the literature was identified with a formal or informal evaluation of an HRA program with actual observed use/non-use. None of the providers contacted in the study indicated any additional findings in this regard.

Generally, HRA programs do not follow-up the appraisal with specific programs, literature, or emphasis on using safety belts to reduce motor vehicle accident risk. This is due to the fact of the immediate seriousness of other risks, such as elevated blood pressure, overweight, smoking, and overuse of alcohol. In

addition, motor vehicle accident risks have historically been regarded as "safety" issues, outside the realm of the health and medical professionals who usually coordinate HRA programs.

Among HRA program coordinators there is support, willingness, and interest in using safety belt use education following administration of the HRA. There was an expressed need for materials and methods to complement HRA results. Time, however, is a factor when HRA results are presented either in one-to-one counseling or in a group session because safety belt use is only one of many risks that must be emphasized.

EFFECTIVENESS OF HEALTH RISK APPRAISAL

Since health risk appraisal is a relatively new practice in the health/medical field, its research base is correspondingly small. One of HRA's major researchers, Jonathan Fielding, in his editorial, "Appraising the Health of Health Risk Appraisal," observed, "that the role and value of health risk appraisals have yet to be fully assessed is beyond dispute" (1982). He continued, "little is known about the relative impact of different types of computer generated risk information, and about how format and the types and strengths of suggestions made to alter personal health habits may influence initial impact or longer term outcomes . . . With so little known there is considerable room for experimentation in a variety of settings and populations, and as part of diverse risk reduction activities."

Other researchers agree that, "scores of papers on Health Hazard Appraisal have been published. Most . . . are descriptive, philosophical, or exhortative; only a few are empirical in nature" (Bartlett et al., 1983). There are very few well controlled studies. The many anecdotal reports of effectiveness in motivating behavior change in a positive direction have stimulated interest in HRA's.

After an extensive review of the HRA literature, Wagner et al. (1982) summarized that the uncontrolled studies suffered from "methodological problems in studying behavior change--volunteer bias, secular change in the public at large, the absence of a comparison (control) group, and measurement unreliability." In addition, many of the studies dealt with small sample size, had high drop-out rates, and used nonrigorous, or sometimes nonexistent statistical analyses. Similar findings were reported by Sacks et al. (1980).

Literature Summary

The literature review for this study considered two annotated bibliographies of health risk appraisal (Beery, 1981; Imrey, 1985) and thirty-six articles/reports in which HRA effectiveness was evaluated. Five controlled studies and two quasi-controlled studies were selected from among those reviewed on the basis of study design, data adequacy, and support of conclusions. These seven are described below.

Controlled Studies

The five studies with the best empirical data are summarized below:

- o The "Go to Health Study" of 1,449 employees of Blue Cross/Blue Shield in Detroit compared HRA alone, HRA plus counseling, HRA plus counseling plus risk reduction education programs, and a control. They found no effect using HRA only. The group with the most interventions (HRA plus counseling plus risk reduction) showed significant improvement in the desired direction. For this group they found reduced smoking and lowered cholesterol levels. Important to business, there was increased productivity, reduced absenteeism, less severity of illness, and drug charges to the medical plan were lower. In sum, the multiple intervention treatment showed positive effect (Faust and Vilnuis, 1982, 1981).
- o The "Well Aware About Health Study" of 1,042 HMO and group practice enrollees tested HRA compared to standard medical exams, HRA plus counseling and education, and standard medical exams plus education. Many parameters were measured including health habits, physical measurements, mental wellness, health knowledge, etc. Results indicate effectiveness of HRA in changing a wide range of behaviors. Greatest effectiveness occurred in the multiple intervention group (Dunton, 1984).
- o The "Live for Life Program" for over 3,000 Johnson & Johnson employees compared their version of HRA plus education with a large control group of Johnson & Johnson employees at separate worksites who were not participants in a health program. The HRA plus education treatment was shown to be effective in significantly increasing regular exercise and stopping smoking. In addition, the Live for Life group demonstrated better general well-being, ability to handle stress, and greater job satisfaction. A comprehensive health program which includes HRA was the stimulus for measurable change (Wilber, 1981).
- o A study of 346 Canadian government workers was the first rigorous controlled study of HRA. It compared HRA only, HRA plus counseling, and a control group for test-retest three months apart. Several positive effects including reduced alcohol consumption and increased exercise were noted with the HRA. However, the study suffered from small sub-samples and inconsistent results in the subgroups (Lauzon, 1977).

- o A total of 144 multispecialty clinic patients were assigned to three groups: HRA, HRA plus counseling by a physician, HRA plus counseling by a health educator. After four months, retest results showed positive improvement in all groups for HRA dependent risks, no difference between groups counseled by a physician and by a health educator. The usefulness of HRA was determined to be entirely dependent on patient receptivity. In spite of rigorous control of study groups, the problems associated with small sample size affected definitive study outcomes (Johns, 1976).

The Quasi-controlled Studies

One of the quasi-controlled studies (Hancock, 1977) reports negligible difference among treatment groups receiving HRA only compared to the no-HRA control. All groups showed positive health behavior changes. These included reduced risk of death from such contributing factors as non-use of belts, high blood pressure, smoking, overweight, and sedentary behavior.

The other semicontrolled study (Fultz, 1977) tested HRA with two types of college health education courses compared to a control (health education course only). Substantial improvements in health risks were noted for HRA combined with relevant educational follow-up.

HRA Effectiveness With Respect to Safety Belt Use

All reports of effectiveness regarding safety belt use using HRA are based on self-reported information. Although safety belt use is known to be somewhat exaggerated in self-reported data, no cases in the HRA literature were found where attempts were made to verify self-reported with observed use. In fact, by design, all the HRA's reviewed used only self-reported safety belt data.

The following summary of recent studies illustrates the effect of HRA on safety belt use. The evaluations were based on HRA alone or combined HRA with group counseling, one-to-one counseling, or risk reduction education. Improvements in safety belt use range from 1 to 23 percent. Nineteen studies are cited from the following settings: work site (7), medical/health (7), community (2), and educational (3).

Work Site

o Computer Hardware/Software Manufacturing and Development Company

A study conducted by Control Data Corporation of almost 4,000 employees found that a significant number of workers who completed two or more health risk profiles reported improving their safety belt use from four to eight percent. Projected annual cost-savings to the corporation from the increase ranged from \$9,210 to \$38,785. Merrill and Sleet (1983, 1984) suggest that "taking a Health Risk Profile may have a motivating effect on increasing safety belt use." Or, it could be that those volunteering to participate in an HRA are more motivated to make recommended changes for improving their health.

o Manufacturing Company Employees

Rodnick (1982) reported a study of 292 employees of a medium sized manufacturing company in California who were retested with HRA one year after the initial HRA and counseling. Of the 207 employees who initially reported using safety belts "none" or "some of the time," 15 percent reported an increase in use.

o Office Workers at an Industrial Plant

Increases in safety belt use were reported in a study of 120 Canadian office workers at an industrial plant who responded to an HRA questionnaire (Hancock et. al., 1977). Two groups received counseling interpretation of their HRA results; one group (the control) received none. Retest with an HRA questionnaire after one year showed that all groups improved their safety belt use behavior (along with other lifestyle improvements). A possible interpretation of these results may be that merely being asked questions about one's lifestyle and health appears to heighten awareness and positive action.

o Hospital Employees

A program conducted in 1981-1982 in Oregon at Portland Adventist Medical Center with 436 hospital employees using The Wellsource, Inc. LIFE HRA demonstrated a 23 percent increase in safety belt use from an initial use of 35 percent to over 58 percent (Hall, 1984).

o Hospital Employees

The Pennsylvania Department of Health Southeastern District conducted four worksite HRA programs in 1983 and followed-up each within one year. Overall, the combined improvement in safety belt use for the four sites was 8 percent. Most notable was at the hospital employees, the HRA was augmented with a specific safety belt education program with literature and films. Retest results showed improvement of 15 percent, to a usage rate of 51 percent. The other sites (all blue-

collar/manufacturing employees) only had HRA and counseling follow-up. They all had initially much lower usage rates (from 3 to 11 percent). All sites showed improvement of from 5 to 7.5 percent (McDonald, 1985).

- o **Employees - General**

Hawaii Department of Health, Honolulu, retested three work site groups, totaling 308 individuals. Within two years safety belt use improved by 9 percent (Murakami-Akatsuka, 1985).

- o **Telecommunications Company Staff**

A current study by McCauley and Johnson is evaluating the impacts of HRA exposure on AT&T Communications (Basking Ridge, New Jersey) employees who voluntarily take General Health's, Health Risk Appraisal at three different times over a 2-year period. The study also will measure the effect of a follow-up program (called TLC), which consists of counseling and education on health behaviors of concern as identified by the HRA process. Preliminary results from the first two data points indicate a positive change in safety belt use (i.e., use of safety belts 75 percent of the time or more) in groups taking the HRA over those in a control group. The percentage of employees in the group receiving HRA plus TLC rose 9 percent from approximately 54 percent to 63 percent. The group which received only the HRA showed an increase of 7 percent from approximately 65 percent to 72 percent. The control group remained almost consistent at 35 percent regular safety belt use. This study seems to be showing a positive effect on safety belt use with exposure to HRA, and an even stronger effect when HRA is combined with a program of education and counseling (McCauley, 1984).

Two cautions should be noted in reviewing these findings. One is the extreme variance in baseline reported safety belt use for each group (54%, 65%, and 35%, respectively). Secondly, one should note that all three groups show baseline safety belt use far in excess of the national average of 15 percent.

Medical/Health

- o **Members of a Health Maintenance Organization (HMO) and a Medical Group Practice**

In the unpublished final report by Well Aware About Health of the largest randomized controlled study of HRA, Dunton (1984) reports statistically significant positive effects of HRA on safety belt use. The subjects, adult enrollees of both the health maintenance organization (HMO) and a group practice clinic, were randomly assigned into four study groups. Subjects completed a comprehensive health inventory questionnaire once a year for three years. Of note is that all treatment groups (even those not receiving HRA) showed increased reported safety belt use over the course of the study. However, the group that received only HRA (which included

a group results explanation) showed strongly statistically significant safety belt use improvement as compared to the other groups (one being a control). Also, a special analysis of data from across the randomized study groups revealed that persons defined as "low risk," those already having certain "healthy characteristics and behaviors," still showed a significant improvement in reported safety belt use over the course of the study.

- o Family Physician's Patients

In a private physician's practice in northern California in 1974, 98 adults were given the HRA and counseled about risk factor improvement. A year later several risk factors showed change, safety belt use improved 24 percent (Werra, 1985).

- o Low-Income, Inner-City Health Clinic Patients

In a study of low-income, inner-city community health clinic participants in Wisconsin, Walker (1980) reported increases in reported safety belt use of 7 percent and 19 percent for clinic users from two respective sites six months after participating in an HRA program with follow-up counseling.

- o Multiethnic Community Health Clinic Patients

Increase in safety belt use by 30 of 97 multiethnic participants of a community health clinic in Hawaii after exposure to HRA and counseling was reported by Dodge and Gleason (1981).

- o Community Preventative Health Center Members

In measuring change in risk for 138 clients of the Community Health Club (a preventative health maintenance organization) of Santa Rosa, California, a 4 percent increase in safety belt use was reported upon follow-up one year after involvement with HRA and counseling (Clendenin, 1974).

- o Community Health Center Patients

"A large increase in (self-reported) compliance" with recommended safety belt use was observed by Milsum et al., 1976, in a 6-month follow-up evaluation of 35 Canadian adults participating in a community health center's HRA which included counselor interpretation of results. The 35 subjects were those who responded to the follow-up evaluation out of 100 adults originally participating in the HRA study.

- o Public Health Workshop Attendees

Warner (1977) reported on the administration of HRA to a group of 150 public health workers attending a workshop. After the HRA results briefing, half (75) of the participants signed behavior change contracts.

Of these, 27 participants contracted to improve safety belt use. On follow-up one year later, 13 (48%) of those who contracted to increase safety belt use reported actually doing so.

Community

- o County Community Health Program

A 16 percent increase in reported safety belt use was noted by Moore and Moody (1983) in a follow-up study of 260 community participants in a computerized HRA with results returned by mail. These results were tallied from a random sample survey of participants in an HRA administered by the Lee County (Florida) Cooperative Extension Service.

- o Elderly Clients of an Urban Nutrition Center

In a small uncontrolled study of participants of a Kansas City elderly nutrition center program, Hartley and Swank (1983) observed increased (self-reported) safety belt use after participants took an HRA followed by three safety education sessions. Results were complicated by the fact that a number of participants reported to often ride in buses where safety belts were not available.

Education

- o College Health Education Students. In a study comparing the use of HRA as part of both an experimental and a traditional college health education to a traditional health education course without HRA, Fultz (1977) reported significant improvements for the two HRA groups in changed health behavior including safety belt use.

- o Teenagers from Medically Underserved Rural Area

One-hundred and sixty teenagers from rural, medically underserved counties participating in a Florida 4-H/Cooperative Extension Service specialized "Teen" HRA were reported by Moody et al., (1980), to appear to increase a number of health enhancing behaviors including an increase in safety belt use. These results were determined by a second administration of the HRA.

- o Teenagers in Rhode Island High School

In November, 1984, the Rhode Island Department of Health retested a high school population one year after the initial Wellness Check HRA. Safety belt use improved 5 percent, from 7 percent regular use during the first year to 11 percent use a year later (Dewey, 1984).

HRA Effectiveness Summary

In summary, most of the studies reviewed indicate that, in general, HRA with follow-up counseling or education, results in health risk improvements. More sound controlled studies are needed to test various components of HRA and methods of use to determine those variables yielding the most effective results.

Hyner and Milby (1985), in their recent article, "Health Risk Appraisals: Use and Misuse," concluded that, "the long-term effects of HRA's have yet to be assessed. . . The shortcomings and limitations of HRA's should be understood for the greatest benefit to be derived from their use."

Regardless of what evaluators decide about the strengths of health risk instruments, ". . . it is difficult to see anything but growth in their use . . . most individuals--independent of background, income, or education--are fascinated by computerized health risk appraisals...In summary, for health risk appraisal to fulfill its promise, however, public health professionals need to guide its further development, by exerting pressure on its purveyors to incorporate the best available epidemiologic information and biostatistical computational rigor into their instruments. More critical still is the need to integrate health risk appraisal into high quality risk reduction and health enhancement programs." (Fielding, 1982)

MOTOR VEHICLE SAFETY AND SAFETY BELT COMPONENTS

As a part of a review of HRA instruments, several were reviewed to identify the extent to which motor vehicle safety and safety belts were contained in HRA questionnaires and results printouts. The findings are summarized by type of HRA (computer-scored, microcomputer-based, and self-scored) in Table 1. Appendix B contains a summary of the HRA instruments reviewed during the study.

Results (Printout or Scored)

Each instrument was analyzed to determine if risk results for motor vehicle accidents and use of safety belts were presented quantitatively. It can be seen from Table 1 that none of the self-scored HRA's met this criteria. All three microcomputer-based HRA's included a quantitative estimation of motor vehicle accident risk. Two of them specified safety belt use risk in numerical terms. Of the computer-scored HRA's, 15 or 83 percent gave a numerical estimation of motor

Table 1
SUMMARY OF MOTOR VEHICLE SAFETY INFORMATION
ON HRA'S, BY TYPE

<u>Motor Vehicle Safety Characteristic</u>	<u>Number of HRA's with Characteristics</u>		
	<u>Computer- Scored HRA's (n=18)</u>	<u>Micro- computer HRA's (n=3)</u>	<u>Self- Scored HRA's (n=11)</u>
<u>Results/Printout</u>			
MVA Risks?	15	3	0
Safety Belt Risks?	11	2	0
<u>Questionnaire</u>			
Safety Belt Used?	18	3	11
Belt Type Used?	2	0	1
Mileage Per Year?	16	3	3
Alcohol Consumed?	18	3	11
Drink and Drive?	5	0	9
Drugs or Medications Used?	12	2	6
Freeway Driving?	3	0	0
Speed Limit Observed?	4	0	6
Car Size?	3	0	0

Note: "n" refers to the number of questionnaires that were reviewed for each type of HRA.

vehicle accident risk. Of these 15, 11 also numerically displayed the risk of current safety belt use either as a component of motor vehicle accident risk or as an indication of the "years of life to be gained" by always buckling-up. (The latter affects the risk age score.)

If HRA results showed specific risks for motor vehicle accidents, usually there were recommendations to improve them. These messages may be brief or detailed. Examples of the various "feedback" messages from selected HRA results printouts are shown in Table 2.

Questionnaire Items on Motor Vehicle Safety

To estimate a respondent's motor vehicle accident risks (including safety belt use), HRA's contain questions on up to nine related topics. They are itemized below in order of frequency of occurrence in the 18 computer-scored HRA's. The number in parenthesis indicates the percentage of the 18 instruments that include the query. (Refer to Table 1 for a comparison of the occurrence of all motor vehicle accident related components by type of HRA.)

In order to "compute" a numeric mortality risk for MVA, responses to the first three or four items are required (i.e., safety belt use, alcohol consumption, mileage per year, and use of mood-modifying drugs/medications). The other five questionnaire items are useful in estimating risk of accidents or injury but not fatalities.

1. Are Safety Belts Used When Riding in a Motor Vehicle? (100%)

The response may be open-ended, asking the respondent to write-in the percentage of time safety belts are used (0-100 percent) or to select a specified percentage range category, such as:

75% - 100%

25% - 74%

10% - 24%

Less than 10% of the time

Table 2

MESSAGES FOR REDUCING
MOTOR VEHICLE ACCIDENT RISKS
(Examples From a Variety of Instruments)

Safety Belt Messages

- o Buckle your seat belt all of the time.
- o By wearing a seat belt and driving defensively, your chances of being injured in an auto accident would be considerably reduced.
- o U.S. studies also indicate that wearing seat belts can reduce injury and death from motor vehicle accidents by 50 percent.
- o You currently wear your seat belt 10 to 25 percent of the time. You can reduce your chances of dying from motor vehicle accidents by wearing your seat belt every time you ride or drive.
- o To be healthier, live longer, and feel better you agree to:
 - Reduce your alcohol consumption
 - Always wear seat belts
- o If you wear seat belts all of the time, your risk of dying from a motor vehicle accident will be reduced and you will extend your useful life expectancy by 0.3 years.
- o You are increasing your health risks by driving after drinking alcohol/taking drugs, exceeding speed limit, not wearing a seat belt all of the time, not wearing a shoulder strap all the time.

Other Motor Vehicle Safety Messages

- o Driving under the influence of alcohol, or drugs, or riding with someone who is, greatly increases your risk of being involved in a life-threatening auto accident.
- o Reduce alcohol use to one drink a day or less.
- o Avoid driving after drinking alcohol or taking drugs.
- o Limit alcohol to 2 drinks/week.
- o If you limit your consumption of alcohol to less than 2 drinks per day and do not drive after drinking or ride with a driver who has been drinking, your risk of dying from motor vehicle accidents, cirrhosis of the liver, and pneumonia will be reduced and you will extend your useful life expectancy by 1.7 years.
- o If you do not use any drugs or medications before driving unless you have consulted with your doctor, your risk of dying from a motor vehicle accident will be reduced and you will extend your useful life expectancy by 0.3 years.

2. Alcohol Consumption (100%)

This determines if a person is a nondrinker, ex-drinker, or drinker. If a drinker, the average number of drinks per week (liquor, beer, or wine) is asked as an open-ended question or using the following type of response categories:

41 drinks or more

25 - 40

13 - 24

7 - 12

3 - 6

1 - 2

On special occasions only

3. Mileage Per Year Traveled in a Motor Vehicle (89%)

Usually this is an open-ended question with the information given that 10,000 miles per year is average. Most questionnaires emphasize that this means miles traveled as both a driver and/or a passenger.

4. Use of Drugs or Medications that Relax or Alter Mood (67%)

This question is asked, like the alcohol consumption question, as such drugs alter one's perception and reaction time. The query relates to frequency of use such as:

Almost every day

Sometimes

Rarely or never

5. Alcohol Consumption Before Driving (28%)

Specifically, do you drive or ride with drivers who have been drinking alcohol or taking drugs?

Often

Sometimes

Rarely or never

6. Observation of Posted Speed Limit (22%)

Such a question might be phrased as: On roads or highways do you normally drive?

Over the posted speed limit

At or below the posted speed limit

7. Travel on Limited Access Highway (17%)

The information is requested as an estimation of the percentage of the miles traveled per year. For example: How many of these miles are on a freeway, expressway, or other limited access highway?

Most (more than 75%)

Some (25-74%)

Little (0-24%)

8. Size of Vehicle Usually Travel In? (17%)

For example: What size vehicle do you drive or ride in most of the time?

Subcompact or sportscar

Compact

Intermediate or full size

Other, (Specify) _____

9. Type of Safety Belt Used (11%)

This refers to a specific question to ascertain if shoulder belts are worn. For example: What percent of the time do you wear a shoulder strap?

0 - 25%

26 - 50%

51 - 75%

76 - 100%

Tables 3, 4, and 5 summarize the extent to which motor vehicle safety topics are covered in computer-scored, microcomputer-based, and self-scored HRA's, respectively.

Table 3

MOTOR VEHICLE SAFETY INFORMATION ON COMPUTER-SCORED HRA'S

Target Group Provider HRA INSTRUMENT	Results Printout				Questionnaire							Total Elements
	MVA Risks?	Safety Belt Risks?	Safety Belt Used?	Belt Type Used?	Mileage Per Year?	Alcohol Consumed?	Drink and Drive?	Drugs or Medications Used?	Freeway Driving?	Speed Limit Observed?	Car Size?	
ADULTS (Ages 20-65)												
Centers for Disease Control CDC/HEALTH RISK APPRAISAL	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	6
Control Data Corporation HEALTH RISK PROFILE	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	5
General Health PERSONAL RISK PROFILE	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	5
Health and Welfare Canada EVAL-U-LIFE	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	5
Institute for Lifestyle Improvement LIFESTYLE ASSESSMENT QUESTIONNAIRE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	9
International Health Awareness Center PULSE	Yes	No	Yes	No	Yes	Yes	No	Yes	No	No	No	5
Medical Datamation HEALTH 80'S QUESTIONNAIRE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	8
Prospective Medicine Center HEALTH HAZARD APPRAISAL	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	6
Regional Health Resource Center RHRC HEALTH HAZARD APPRAISAL	Yes	No	Yes	No	Yes	Yes	No	No	No	Yes	Yes	6

Table 3 (Continued)

MOTOR VEHICLE SAFETY INFORMATION ON COMPUTER-SCORED HRA'S

Target Group Provider HRA INSTRUMENT	Results Printout		Questionnaire									Total Elements
	MVA Risks?	Safety Belt Risks?	Safety Belt Used?	Belt Type Used?	Mileage Per Year?	Alcohol Consumed?	Drink and Drive?	Drugs or Medications Used?	Freeway Driving?	Speed Limit Observed?	Car Size?	
<u>ADULTS (Ages 20-65) Continued</u>												
Rhode Island Department of Health WELLNESS CHECK	Narrative		Yes	No	No	Yes	Yes	No	No	No	No	5
St. Louis County Health Department HEALTH RISK APPRAISAL QUESTIONNAIRE	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	7
Straub Clinic HEALTH POTENTIAL APPRAISAL	No	No	Yes	No	Yes	Yes	No	Yes	No	No	No	4
University of California - San Francisco HEALTH HAZARD APPRAISAL QUESTIONNAIRE	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	7
Well Aware About Health YOUR HEALTH RISK PROFILE	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	9
Wellsourc, Inc. LIFE	Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	No	6
Wisconsin Center for Health Risk Research HEALTH RISK ASSESSMENT QUESTIONNAIRE	Yes	Yes	Yes	No	Yes	Yes	No	No	No	No	No	5
<u>TEENS/YOUNG ADULTS (Ages 12-20)</u>												
Centers for Disease Control TEEN HEALTH RISK APPRAISAL	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	7
Rhode Island Department of Health TEEN WELLNESS CHECK	Narrative		Yes	No	No	Yes	Yes	Yes	No	Yes	No	7
TOTAL (with Specific Characteristic)	15	11	18	2	16	18	5	12	3	4	3	

Table 4

MOTOR VEHICLE SAFETY INFORMATION CONTAINED ON MICROCOMPUTER-BASED HRA'S

Target Group Provider HRA INSTRUMENT	Results Printout				Questionnaire							Total Elements
	MVA Risks?	Safety Belt Risks?	Safety Belt Used?	Belt Type Used?	Mileage Per Year?	Alcohol Consumed?	Drink and Drive?	Drugs or Medications Used?	Freeway Driving?	Speed Limit Observed?	Car Size?	
Centers for Disease Control CDC/ADULT HRA for IBM-PC	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	6
Minnesota Educational Computing Corporation HEALTH MAINTENANCE ASSESSMENT Vol. 2 for Apple II	Yes	No	Yes	No	Yes	Yes	No	No	No	No	No	4
University of Minnesota HEALTH RISK APPRAISAL (UM-HRA) for Apple II, II+, and IIe	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No	No	6
TOTAL (with Specific Characteristic)	3	2	3	0	3	3	0	2	0	0	0	

Table 5
MOTOR VEHICLE SAFETY INFORMATION CONTAINED ON SELF-SCORED HRA'S

Target Group Provider HRA INSTRUMENT	Results Printout		Questionnaire										Total Elements
	MVA Risks?	Safety Belt Risks?	Safety Belt Used?	Belt Type Used?	Mileage Per Year?	Alcohol Consumed?	Drink and Drive?	Drugs or Medications Used?	Freeway Driving?	Speed Limit Observed?	Car Size?		
Center for Consumer Health Education LIFESCORE FOR YOUR HEALTH	No	No	Yes	No	No	Yes	No	No	No	No	No	2	
Health and Welfare Canada YOUR LIFESTYLE PROFILE	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	6	
Kansas Department of Health and Environment P.L.U.S. TO YOUR LIFE	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	6	
Northwestern Mutual Life THE LONGEVITY GAME	No	No	Yes	No	No	Yes	No	No	No	No	No	2	
Pima County Health Dept. ADULT AWARENESS PROGRAM	No	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	6	
Rodale Press YOUR PERSONAL PREVENTION REPORT CARD	No	No	Yes	No	No	Yes	Yes	No	No	No	No	3	
Texas Department of Health HEALTH RISK PROFILE AND MY PERSONAL HEALTH PROFILE	No	No	Yes	No	No	Yes	Yes	No	No	No	No	3	
U.S. Department of Health and Human Services HEALTHSTYLE - A SELF- TEST	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	5	
University of Rhode Island Health Services HEALTH GRAPH	No	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	5	
Wellness Associates WELLNESS INDEX (Long Form)	No	No	Yes	Yes	No	Yes	Yes	No	No	Yes	No	5	
Wyoming Division of Health and Medical Services HEALTHSTYLE - A SELF- TEST FOR SENIORS	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No	4	
TOTAL (with Specific Characteristic)	0	0	11	1	3	11	9	6	0	6	0		

2. EDUCATIONAL MATERIALS

Educational materials were developed in this study to supplement HRA programs on the subject of safety belts. The package, referred to as The Great American Habit Plan (GAHP), combined selected educational materials and messages using the fundamentals of behavior change theory. The primary purpose of the GAHP was to increase the potential for HRA programs to effect positive changes in the safety belt use behavior of an individual.

TRAFFIC SAFETY PROGRAMS AND MATERIALS

Efforts to promote the use of safety belts, within a traffic safety program context, were reviewed to identify effective elements for use in developing educational procedures and materials to accompany HRA programs. In addition, available materials used in this promotion of safety belts (films, pamphlets, posters, curriculum) were reviewed for possible use as educational materials.

Safety Belt Programs

Numerous programs and promotional activities have been implemented to increase safety belt use. Many of these programs were reviewed by Nichols (1982); who found that educational efforts and programs involving incentives and rewards had good potential for promoting safety belt use. However, it was pointed out in this and other research studies that program effectiveness was maximized when selected approaches are combined to form a multifaceted program that "delivers the message in a variety of ways, through a variety of sources" (Amoni, 1984).

In the sections that follow, brief descriptions and evaluation results of selected programs and promotional activities are summarized for specific program settings and target groups.

Business/Worksite Programs

In general, three techniques have been employed to promote safety belt use in business settings: education, incentives, and safety belt use policies. A review of the literature on the effectiveness of corporate safety belt programs suggested that

combinations of the above program approaches resulted in significant increases in employee safety belt use rates. Geller, Patterson, and Talbott (1982) reported an approximate doubling of employee safety belt use rates as a result of a program which combined education and incentive techniques. Other programs that combined education, incentives, and safety belt use policies achieved safety belt use rates in the range of 70 to 90 percent (Geller, 1983, 1984). Research also indicated that, although usage rates tend to decline over time, some programs were able to maintain relatively high usage rates through intermittent reinforcement of selected program elements (Geller, 1983, 1984). Other references that reported high levels of success for corporate safety belt use programs include Campbell et al. (1984) and Sleet (1984).

Educational delivery systems used in business settings include lectures, discussions, group awareness sessions, demonstrations, and workshops. Research suggests that discussion sessions, in which individuals are encouraged to discuss reasons for using or not using safety belts are particularly effective in gaining group consensus of the value of safety belts (Sheard, Kane, and Dane, 1984). However, it was less clear how such consensus translates into increased safety belt use. Many educational efforts were enhanced through the use of "expert" presentors such as police, physicians, or emergency medical personnel, and the use of aids such as the "Convincer" device (the Convincer simulates a low speed crash). Also, available printed and visual aid materials were extensively used to supplement program efforts.

Typical applications of incentives involve providing an incentive or a reward to those individuals who, through behavior modification, are observed or pledge to wear safety belts. The rationale for incentive approaches was to provide an individual with a reason for using a safety belt other than the benefits achieved in personal health and safety. Nichols (1982) suggested that both voluntary and mandatory safety belt programs can be more successful if incentives were incorporated into safety program.

Incentive programs are gaining increasing utilization within corporate settings and are considered to be one of the more powerful of all voluntary usage approaches (Nichols 1982). For example, Geller (1982) describes case studies of 12 corporate-based safety belt programs in which incentive approaches were used.

Incentives and rewards have been offered in several creative ways. In some cases, immediate rewards were given to the safety belt user in the form of coupons for fast-foods, tickets for a free lunch, mugs, car accessories, letters of commendation, monetary rewards, gift certificates, and many others. In other cases, delayed rewards were given in the form of raffle tickets for use in drawings and lotteries. Other research conducted for NHTSA by Coonley and Gurvitz (1983) investigated the feasibility of providing insurance incentives.

In evaluation studies of corporate incentive programs, significant increases in usage rates were achieved. Usage rates of between 60 to 90 percent were not uncommon. However, the reported levels of increase were confounded by other program elements. In studies by Geller (1982 through 1984), hard-core non-users were more apt to participate in an incentive program if discussion sessions were held in conjunction with the incentive program. In another study by Campbell (1982), it was reported that the most successful incentive programs are based on reward systems where the probability of receiving an incentive was high, even though the reward itself was modest. Other research studies of incentive programs indicated that program effectiveness is a function of the length of the incentive program, the availability of information on safety belt issues, and the rewards given during the program. Declines in usage rates over time following the completion of an incentive program were observed, however, beneficial residual effects in terms of rates being higher than preprogram usage rates were observed (Sleet and Geller, 1986).

Safety belt use policies were adopted in several corporate settings with strong safety programs. Among the more visible corporate settings with use policies were the DuPont Company, Berg Electronics, Dow Chemical, and Northwestern Bell. In addition, policies were adopted by the U.S. Air Force, the U.S. Department of Transportation, and in some state transportation departments.

Safety belt use policies were implemented in a variety of ways. In some cases, the policy statement was simply an expression of the company's position on the use of safety belts in company vehicles. In other cases, stronger positions were taken that involve penalizing employees for failure to use safety belts while on the job or while using a company vehicle. In still another instance, safety belt use was

mandated for all employees for on and off the job as a condition of the employees life, health, and accident insurance premiums being paid by the company.

In the 1982 study by Nichols, safety belt use policies were indicated as one of the more effective means of increasing safety belt use within many population segments. In the corporate settings for which use policies have been adopted, usage rates between 60 to 90 percent were reported. However, these programs included several other elements besides use policies (i.e., educational programs and incentive programs), and therefore, the observed usage rates could not be entirely attributed to a particular element of the program.

Medical Setting Programs

Most of the safety programs dealing with occupant protection that have been undertaken in hospitals, health clinics, and physician offices, have been directed toward the promotion of child safety seats. While printed material and verbal recommendations are common within these settings, no formal safety belt promotion programs were identified for patients or clients, per se. Waller and Li (1982) observed, however, that since motor vehicle injuries were a primary concern within the medical community as they regularly come into contact with people who are especially difficult to reach with other safety belt program messages and techniques, the potential for increasing the use of safety belts within these population groups is great.

Trinkoff et al. (1983) indicated that most of the involvement in the area of safety belt promotion comes from local health departments. However, as mentioned earlier, this involvement has been primarily in the area of child safety seat promotion and the establishment of safety seat loaner programs. In addition to this involvement, many health departments have adopted programs which emphasize safety belt use through health risk appraisal.

One particular area in which the medical community has made valuable contributions in the area of safety belts is through the dissemination of public information and education. In addition, most child safety seat programs are accompanied by additional information, materials, and messages regarding the use of occupant restraint systems by adults. Members of the medical community have

also been actively involved in making presentations to schools, day care centers, and other public groups regarding the need and importance of occupant protection and organizing health fairs. Because of the sporadic nature of safety belt program involvement within medical settings (other than those involving health risk appraisal programs), no formal evaluations were identified in the literature.

School Setting Programs for Young Adults

A significant amount of research and program development work has been done to promote safety belt use in the high school and young adult population group. The amount of work directed to these populations related to the fact that this age group exhibited one of the lowest usage rates while having the highest risk for involvement in motor vehicle accidents. Most of the recent work in the area of promoting safety belts for young adults was the subject of review by Lovato, Thompson, and Kolbe (1984). In this research, over 20 audiovisual material packages, 11 curriculum packages, and references in four catalogs and bibliographies were reviewed and evaluated.

The literature contained descriptions of programs that employed both education and incentive techniques within programs for high school students and young adults. In a study by McPherson (1983), four education modules were developed and tested within a high school setting. The educational modules that were developed and tested are (1) information, (2) testimonial, (3) convincer, and (4) vehicle. The information module consisted of a brief description on what happens in a collision, the "human" collision, the odds of being in an accident, the benefits of safety belts, and the myths concerning occupant protection systems. The testimonial module consisted of a testimonial slide/tape presentation of safety belt use. The convincer module consisted of the use of the safety belt convincer device. The vehicle module consisted of students riding as passengers in an instructor-driven vehicle in which the students were restrained by safety belts.

An evaluation of the four modules indicated that all modules were capable of having a beneficial effect on the use of safety belts. The information and testimonial modules resulted in significant gains in knowledge, attitudes towards safety belts, and the use of safety belts. Gains in knowledge, attitudes, and safety belt use were observed to be less significant for the vehicle and convincer modules.

The "message" delivered as part of an educational process was identified as one of the determining factors in program effectiveness. "Focus group" research conducted by Benson (1983), suggested that a primary message theme for young adults should be one that depicts that wearing a safety belt is "chic." This recommendation was based on the presumption that social position and peer pressure were predominate influences within a young adult's life (safety belt messages are covered in greater detail in the next section). Thus, if safety belts can be shown to be a socially accepted practice, significant increases can be expected for the young adult and high school age groups.

Education and incentives were combined in a program developed by Campbell, Hunter, and Stutts (1984). The overall program consisted of providing information on safety belt effectiveness, risks to teenagers, statistics, and the announcement and explanation of the incentive program. The incentive phase of the program was conducted over a 4-week period and consisted of randomly providing coupons that were redeemable for \$5 and gaining eligibility to a lottery drawing for a \$300 gift certificate.

An evaluation of this program consisted of collecting over 10,000 safety belt observations. Usage rates were observed to range between 28 and 39 percent during the educational phase, between 46 and 54 percent during the incentive phase, and between 60 to 70 percent during the final lottery stage. Pre-program usage rates were observed to be around 21 percent. Usage rate following the completion of the program was observed to be 36 percent which was higher than the average rate of 32 percent observed during the educational phase.

Community Programs

The literature contained relatively few community program descriptions that involved an evaluation on the effectiveness of the program. One program that was developed and evaluated by Campbell et al. (1984) consisted of a combination of program approaches including both educational and incentive components. The program consisted of a 6-month effort during which media and incentive phases were implemented. In addition, brochures, informational flyers, and bumper stickers were developed and distributed throughout the program.

The incentive phase of the program consisted of awarding prizes to individuals observed wearing safety belts in the community. Prizes included free meals at fast-food restaurants, six packs of soft drinks, and t-shirts. The estimated value of each incentive was approximately \$4. In addition, monthly drawings were held for a \$500 prize and a grand prize drawing for \$1,000 was held.

Program evaluation was based on observed usage of safety belts within the community. The baseline use rate prior to program initiation was observed to be 24 percent. Usage rates were observed to steadily increase throughout the incentive phase and reached at peak of 41 percent during the final week of the incentive phase. Post incentive phase usage rates were observed to be approximately 35 percent.

The research cited above resulted in the development of a guidebook entitled, "Community Seat Belt Incentive Programs" prepared by Campbell, Hunter, Gemming, and Stewart (1984). This guidebook contains a comprehensive description of the program, program components, and evaluation techniques used in the research.

Safety Belt Messages and Materials

In this section of the report, information is provided on selected studies dealing with the development of safety belt messages and the availability of existing materials (films, pamphlets, and instructional curricula).

Message Development

The effectiveness of messages for motivating behavior change depends on the program structure within which the messages are presented, the nature of the message, and the delivery system. A general discussion of safety belt program techniques and associated effectiveness for selected target groups was the subject of the preceding section of this report. The focus for this section of the report is the development and delivery of safety belt messages.

Nichols (1982) performed a review of several studies that contained suggested approaches for increasing the voluntary use of safety belts. Inherent in the approaches were several themes for safety belt messages. The following points

summarize the themes upon which safety belt messages have been or may be developed.

- o A study by Market Opinion Research (1977) suggested that messages should be directed at specific groups of safety belt users and nonusers, based on the predominate attitudes of each groups towards safety belt use. These attitudes (in order of importance) for specific groups of users and nonusers included the following:

Confirmed Users: Fear of entrapment, worry about accidents, and careful driving habits.

Moderate Users: Safety belt effectiveness, fear of entrapment, and careful driving habits.

Infrequent Users: Safety belt effectiveness, worry about accidents, and fear of entrapment.

Adolescence: Safety belt effectiveness, fear of entrapment, and careful driving habits.

Based on the above factors, the following types of message content were suggested.

Messages that demonstrate the necessity of safety belts in defining what makes a good driver.

Messages that encourage the driver, through his or her authority position, to be responsible for safety belt use of others in the car.

Messages that make the fastening of safety belts an integral part of the automobile trip start-up procedure.

- o A study by Tarrance and Associates (1981) suggested the following message-related recommendations for infrequent users of safety belts.

Messages should avoid statistical themes.

Messages should attempt to increase the feelings of responsibility for safety belt use on the part of the driver.

Messages should emphasize the economic benefits of using safety belts.

Safety belt messages should dispel the myths associated with safety belt use and at the same time avoid suggesting myths to individuals who may not have considered them previously.

- o Studies performed for the Transportation Research Board (1979, 1980) suggested that messages should emphasize that automobile deaths and injuries must be perceived as a public health problem.

Nichols concluded from his review that the following types of messages have potential for successfully modifying safety belt use behavior.

- o Messages that explain the function of safety belts.
- o Messages that emphasize that everyone needs to wear safety belts.
- o Messages that state that the nonuse of safety belts is a public health issue.
- o Messages that stress the leadership role of the driver and his or her responsibility for encouraging safety belt use for automobile occupants.

In a study on the development of safety belt message content for various target groups, Benson (1983) conducted 30 focus groups to determine potentially effective motivational approaches, themes, and message content. Five target groups were used: pre-drivers (12-16), young drivers (17-19), high risk drivers (19-24), parents with young children, and elderly (60 and over). In general, messages and themes that associated safety belt use with either preventive health or "the other guy" were most effective. However, message acceptance differed with the target group and delivery system. Other pertinent study findings are summarized below:

- o The use of the term "safety belt" (not seat belt) is important and conveys a better understanding of the function of the device.
- o Placing safety belt use in a preventive health context is more positively received than negative connotations, such as, death, blood and guts, etc.
- o Messages should emphasize the need for safety belts through reference to an external force or object, such as, the potential danger of "the other guy (driver)" so buckle-up.
- o For parents, the positive message "do not let me become an orphan" was effective in obtaining higher usage rates.
- o Young adults responded positively to themes that suggest belt use is socially acceptable.
- o Many drivers perceive the use of safety belts as an acknowledgement of poor driving capabilities. Therefore, "defensive driving" themes may be more positively accepted.

- o Messages and information should stress the operational characteristics of safety belts since many people do not understand the principals of inertial belt systems.

Hidlebaugh and Richman (1984) undertook a study to identify existing materials and/or develop new materials that were consistent with the recommendations made in the study by Benson (1983). Nearly 80 pieces of printed material were evaluated for possible use and none were found to be directly applicable to the target groups that were being considered in the study. Therefore, new materials were developed for the following target groups.

- o Parents of children under the age of 5.
- o Pre-drivers, ages 12-16.
- o Teenage drivers and passengers, ages 16-19.
- o High risk transitional drivers, ages 19-24 (this group was further defined as male drivers not working or not attending school on a full-time basis, or were not married).

The themes upon which messages and materials were developed for the target group consisting of teenage drivers and passengers were:

- o Emphasis on health and safety messages.
- o Protection against the "other guy," and the unpredictability of an accident.
- o Messages that attempt to popularize safety belt use using peer pressure.

The themes for messages and materials for the high risk transitional driver target group included the following:

- o Emphasis on health and safety messages.
- o Protection against the "other guy," and the unpredictability of an accident.
- o Information on the operational characteristics of inertial safety belt systems.

Research in the area of risk perception was conducted to develop safety belt messages that emphasized the reduction of risk. A study by Schwalm, Slovic, and Waller (1982) suggested that strong risk perception messages centered around (1) the

physics of the second (human) collision, (2) the lack of driver control over outside factors, such as, poor weather or drunk drivers, and (3) the small amount of time and inconvenience needed to buckle-up were potentially effective.

Materials and Information

Numerous safety belt audiovisual and printed materials have been developed throughout the years on the basis of behavioral research activities. Such materials have served as supplements to most program efforts to inform, educate, and increase awareness on a variety of safety belt subjects. These materials and others related to safety belt (and child safety seat) use were the subject of review, cataloging, and publication in several comprehensive documents. Of particular note are the recent documents prepared by NHTSA (1983), Grimm and Siegel (1984), Boone and Woodward (1984), and Hollenbach and Sleet (1984). In addition, a catalog of materials specifically for high school and young adult groups was prepared by Lovato, Thompson, and Kolbe (1984). A summary of available films, pamphlets, posters, and curriculum packages have been drawn from various sources and provided in Appendix C.

BASIS FOR THE GREAT AMERICAN HABIT PLAN

The GAHP presents a model for behavior change and uses safety belt use as the behavior to be changed (or reinforced). This approach differs from conventional, educational materials on safety belts in that the use and effectiveness of occupant restraint systems are not emphasized, per se. Rather, information is given on what constitutes personal habits and how habits are developed or changed. Behavior change theory is used as the basis for changing personal behavior patterns and habits. Regular safety belt use is introduced as a sample behavior that can be modified using the "plan" described in the GAHP.

The behavior change principles that form the basis for the GAHP include the following:

- o Self-awareness (risk perception)
- o Problem identification
- o Development of a plan of action

- o Skill development
- o Self-evaluation

These principles were used to develop the behavior change model that consisted of the "4-R's" which include (1) risk appraisal, (2) resolution, (3) reminders, and (4) record keeping. The risk appraisal element of the habit change model is addressed through the HRA survey instrument. Risk-related information is provided in the GAHP which focuses upon the risk associated with motor vehicle accidents and the nonuse of safety belts. The resolution element of the model is addressed through a contract which encourages an individual to resolve to the use of safety belts in the future. The reminder element is achieved by the packaging of the GAHP which consisted of a brochure designed to be attached to the sun visor of an automobile. The conspicuity of the brochure provides a visual reminder of the drivers resolution to buckle-up. The record keeping element of the model is also achieved through the packaging which provides a 21-day safety belt use log on the brochure. The contents of the GAHP are described below.

DESCRIPTION OF THE EDUCATIONAL MATERIALS

The GAHP was designed for multiple use as an instructional aid for HRA program providers, a source of information on behavior change theory and safety belt effectiveness, and a means of reinforcing the principles presented in the GAHP through activities to be performed by participants of the HRA program. Figures 1 and 2 show the front and back layout of the GAHP. The entire brochure is presented in Appendix D.

Packaging

The GAHP is a multifold package of information and activities. Printed material is provided on both sides of the 17-inch by 18-inch brochure which folds to a size of 8 1/2 by 6 1/8 inches. The package was designed to project a positive, patriotic theme through its title, its coloration (red, white, and blue), and the opening quotation by Mark Twain. Concise wording is used to present key definitions, recommendations, and activities. Graphical illustrations are used to

reinforce key concepts and messages. The GAHP package also includes a metal clip for attaching the brochure to a motor vehicle sun visor and a pencil imprinted with the GAHP theme.

Information

The GAHP provides information on behavior change theory and safety belt effectiveness. Behavior change information includes a description of what constitutes personal habit and discusses how habits are formed. Activities are provided in the form of a four-part plan for forming healthy habits. The components of the plan (referred to as the 4-R's) include:

- o Risk Appraisal
- o Resolution
- o Reminders
- o Record Keeping

Safety belt information provided in the GAHP is drawn primarily from existing literature on safety belt effectiveness and safety belt myths and facts.

Reinforcement Activities

A major portion of the GAHP is directed toward reinforcing the four components of the plan. Risk appraisal activities make use of the HRA screening results and emphasize motor vehicle risks related to safety belts and size of car. Resolution activities require the execution of a resolution or contract to "buckle up." Reminder activities involve attaching the GAHP package to the sun visor using a metal clip which is provided with the package. The GAHP is designed to show the signed resolution and the message, "Buckle up--It's a healthy habit" while the sun visor is in the "up" position. The record keeping activity requires the completion of a 21-day safety belt use log. The GAHP package is designed to exhibit the log when the sun visor is in the "down" position. A pencil, imprinted with the GAHP theme logo, is provided with the package.

PROGRAM INTEGRATION

Integration of the GAHP educational materials into a typical HRA program was based primarily on the opportunity for integrating educational materials and the duration of time which could be dedicated to the presentation of the material. Initially, three opportunities for integration were identified. The opportunities included: 1) the HRA screening session, 2) the HRA counseling session, and 3) intervention/education programs that follow counseling, such as exercise, smoking cessation, or weight loss programs. Each opportunity was discussed with numerous HRA program providers to determine the feasibility of GAHP integration. These discussions resulted in an observation that insufficient time was available during the HRA screening session to achieve desirable levels of verbal interaction on the information contained in the GAHP. Consideration was given to providing printed material other than the GAHP at the HRA screening session. However, printed material alone was not considered as an effective means of initiating the GAHP or safety belt issues in general. Because of the time limitations and the general lack of sufficient opportunity to initiate the GAHP in the desired manner, it was decided that the educational materials would most effectively be presented at the HRA counseling session.

Discussions with HRA program providers indicated that the GAHP information could be easily integrated with (and supplement) the HRA counseling session as a part of the presentation of personal risks and risk reduction. During field tests, the GAHP was introduced as a part of the motor vehicle risk discussion where regular safety belt use was presented as a simple, healthy habit that could be adopted and result in an immediate reduction of motor vehicle risk. Following this introduction, the risk appraisal element of the GAHP was discussed during the review of HRA results. This was followed by a request to adopt regular safety belt use as a healthy habit. HRA participants were asked to sign the resolution contained in the GAHP package and instructions were given on how to attach the package to the sun visor of the motor vehicle. Next, the use of the 21-day safety belt log was demonstrated. For the field tests conducted during this study, prize drawings were conducted approximately three to four weeks following the completion of HRA counseling. Completion and submittal of the 21-day safety belt log was required for eligibility in the prize drawing. Prize amounts of \$100, \$50, and \$25, were used in the field tests.

Training of HRA Program Counselors

Training sessions were conducted to instruct HRA program counselors on the integration and presentation of the GAHP. Training was conducted for all field test sites by a single trainer with experience in conducting HRA programs. Training activities stressed the use of the GAHP materials as a complement to the current HRA program. Prior to training, counselors were asked to consider how the materials could be introduced within their particular program. Counselors were asked to develop a procedure and script of how they would introduce the GAHP. The resulting procedures and scripts were then discussed during the training session. A consensus procedure was then identified and adopted for introducing the GAHP.

During the training sessions, instructions and guidelines were given on how to accomplish the activities contained in the GAHP. This included the following:

- o Completion of the risk appraisal activity.
- o Signing of the "Buckle-Up" resolution.
- o Attachment of the GAHP brochure to the sun visor.
- o Instructions for recording safety belt use on the 21-day log.
- o Instructions for returning completed safety belt use logs to become eligible for the monetary drawing.

Following the training session, practice sessions were conducted to give each counselor an opportunity to introduce and present the GAHP materials in a simulated HRA program. In some cases, the GAHP was used in a non-field test HRA program to allow the counselors to become familiar with presenting the materials. The trainer was available for the initial HRA programs to monitor presentations, answer questions, and provide necessary assistance during the HRA counseling session.

OBSERVATIONS ON THE UTILITY OF THE GREAT AMERICAN HABIT PLAN

The GAHP brochure was developed as an easy-to-use, time-limited, educational complement to be introduced during the HRA counseling session. The following points summarize the utility of the GAHP based on discussions with HRA program counselors.

- o The GAHP was very helpful in defining habits and how they are formed.
- o The 4-R's were clever and appealing.
 - Often there was not time to go through the "Risk Appraisal" exercise that included estimation of risk for car size combined with safety belt use.
 - Response was very positive to the Resolution/Reminder exercise. Most people signed it and had it cosigned by a friend.
 - The 21-day log was completed by a high percentage of HRA participants as evidenced by the number who were eligible for the prize drawings.
- o Time was the major constraint and complaint. In both group and one-to-one counseling sessions, time was often so limited that the GAHP was too briefly explained. In the sites that used one-to-one counseling, the counselor sometimes decided not to use the GAHP in its entirety due to the severity of other health risks or because the person was absolutely negative to safety belt use.
- o Most counselors felt that employing safety belt use as an example of habit change and providing prize incentives was positive and nonthreatening.
- o The GAHP became a "healthy" game endorsed by most participants.

In general, the HRA counselors felt positive about the educational materials. Some suggested it should be more brief. Overall, they felt it heightened participant's awareness about motor vehicle safety issues and heightened the interest of the HRA counselors on the importance of emphasizing safety issues.

3. FIELD TESTING

Field tests were conducted to address the following analysis objectives:

- o Determine the extent to which HRA programs affect observed safety belt use.
- o Determine the extent to which HRA programs, supplemented by the Great American Habit Plan (GAHP), affect observed safety belt use.
- o Determine the differential effects of HRA (with and without the GAHP) on safety belt use in states with and without mandatory safety belt use laws.
- o Determine the differential effects of HRA (with and without the GAHP) on safety belt use in work site and medical settings.

These objectives were addressed by conducting controlled field tests in each of four states. HRA programs, with and without the educational materials, were conducted for matched subject groups in work and medical settings, each located in states with and without mandatory safety belt use laws. Observed safety belt use of treatment and control groups was used as the measure of effectiveness.

The objectives listed above were not entirely addressed due to the termination of data collection activities prior to the attainment of the desired sample of safety belt observations. Termination of data collection activities resulted in insufficient data for the conclusive determination of HRA and GAHP effectiveness in medical settings. In addition, actions taken to ensure experimental validity resulted in the disqualification of an experimental group in a work setting. This disqualification was due to significant differences between the baseline safety belt use of a treatment group and its associated control group. This limited the ability to respond to analysis objectives related to the incremental effectiveness of the GAHP in work settings.

EXPERIMENTAL DESIGN

The experimental design consisted of conducting four field tests for matched groups using a longitudinal study design with repeated measures. Each field test was designed to include three groups consisting of two treatment groups and one control group as described below.

- o "HRA only" treatment group. This group underwent a typical HRA program provided by an HRA program provider.
- o "HRA with education" treatment group. This group underwent an HRA program that included the Great American Habit Plan.
- o Control group. This group was identified using selection criteria that achieved demographic, locational, and environmental similarities with the treatment groups described above.

Treatment groups were identified with the assistance of four HRA program providers who expressed an interest in field test participation and met a prescribed set of selection criteria. The program providers who participated in the field tests are listed below.

- o Pennsylvania State Department of Health in Reading, Pennsylvania.
- o Winnebago County Health Department in Rockford, Illinois.
- o CIGNA Health Plan of Arizona in Phoenix, Arizona.
- o CIGNA Health Plan of California in Santa Ana, California.

Field tests in Pennsylvania and Illinois were conducted at blue-collar work sites. Both providers used the Centers for Disease Control HRA questionnaire. Screening and counseling sessions were provided in a group setting. At the time of field testing, Illinois was under a mandatory safety belt use law enacted in July, 1985. At the time of field testing, a safety belt law did not exist in Pennsylvania.

Field tests in Arizona and California were conducted in a medical setting for individuals participating in a wellness program. CIGNA used the Medical Datamation HRA questionnaire. At the time of field testing, a mandatory use law existed in California (enacted in January, 1986) and no law existed in Arizona. Figure 3 shows the assignments of various field test facilities (companies) to the experimental groups listed above.

The measure of effectiveness was observed safety belt use by front seat passengers. Safety belt use data were collected by trained field observers at specified times during the HRA program. Treatment groups were observed at four points in time and data were collected for control groups during times which coincided with the following observations of treatment groups.

Figure 3

EXPERIMENTAL GROUP ASSIGNMENTS

<u>State and Company</u>	<u>Experimental Group</u>		
	<u>HRA With Education</u>	<u>HRA Only</u>	<u>Control</u>
Pennsylvania			
Boyertown Casket Company	●		
Atlas Mineral and Chemical Company		●	
Wagner Electric Company			●
Illinois			
Testors	●		
Metalcrafters		●	
Estwing			●
Arizona			
CIGNA Health Plan of Arizona (Clients Participating in HRA)	●	●	
CIGNA Health Plan of Arizona (Clients Not Participating in HRA)			●
California			
CIGNA Health Plan of California (Clients Participating in HRA)	●	●	
CIGNA Health Plan (Clients Not Participating in HRA)			●

- o Before HRA screening (baseline observation).
- o Between HRA screening and HRA counseling (post-screening observation).
- o Following HRA counseling (post-counseling observations).
- o Two to three months following HRA counseling (delayed post-counseling observation).

Figure 4 shows the data collection activities undertaken for each field test. Delayed post-counseling observations were obtained only for the work site field tests conducted in Pennsylvania and Illinois. Contract funds were insufficient to obtain delayed post-counseling observations at the medical setting field tests in Arizona and California, as well as post-counseling observations in California.

EXPERIMENTAL GROUPS

Three experimental groups were selected for each field test. In Pennsylvania and Illinois, where field tests were conducted in work settings, separate blue-collar employers served as the experimental groups. The selection process for these groups consisted of first identifying HRA program providers with similar HRA programs, similar clients, and similar locales of operation. The Pennsylvania State Health Department and the Winnebago County Health Department satisfied these criteria. Both providers focused primarily on small, private companies with predominantly blue-collar work forces in rural and small urban areas. The schedule of upcoming HRA programs for each provider was examined to identify experimental groups with similar characteristics. Attempts were made to achieve similarity between the three experimental groups within a single field test state and to the extent possible, between states. Following the identification of prospective experimental groups, the following work force information was requested and compared.

- o Number of employees
- o Percentage of blue-collar and white-collar employees
- o Percentage of male and female employees
- o Average age of work force
- o Level of education

Figure 4

SUMMARY OF DATA COLLECTION ACTIVITIES

<u>State and Company</u>	<u>Safety Belt Observation</u>			
	<u>Baseline</u>	<u>Post-Screening</u>	<u>Post-Counseling</u>	<u>Delayed Post-Counseling</u>
Pennsylvania				
Boyertown Casket Co.	●	●	●	●
Atlas Mineral and Chemical Co.	●	●	●	●
Wagner Electric Co.	●	●	●	●
Illinois				
Testors	●	●	●	●
Metalcrafters	●	---	---	---
Estwing	●	●	●	●
Arizona				
CIGNA Health Plan of Arizona (Clients Participating in HRA)	●	X	XX	---
CIGNA Health Plan of Arizona (Clients Not Participating in HRA)	●	X	XX	---
California				
CIGNA Health Plan of California (Clients Participating in HRA)	●	XX	---	---
CIGNA Health Plan (Clients Not Participating in HRA)	●	XX	---	---

- Data collection completed
- X Data collection completed for HRA Only group
- XX Data collection not completed
- No data collection

Table 6 shows a summary of the work force characteristics for the six experimental groups selected in Pennsylvania and Illinois. Also shown on Table 6 is the assignments of companies to a particular experimental group. Assignments of companies to treatment groups was based on the willingness of the management personnel of each company to participate in field test activities and the availability of sufficient time to train the HRA program counselors prior to the scheduled HRA counseling session. Companies with similar work forces who were scheduled to either undergo HRA programs at a later date or who had declined to undergo HRA programs provided the control group for each field test.

To ensure the validity of the experimental design, statistical comparisons of baseline safety belt use data were conducted. Table 6 shows the observed usage rates (expressed as the percentage of front seat passengers observed wearing safety belts) for all experimental groups in Pennsylvania and Illinois. Chi square analyses indicated no significant differences (at the 0.05 level of significance) between the three experimental groups in Pennsylvania. Significant differences were observed in Illinois when the baseline safety belt use rate at Metalcrafters was compared with baseline rates at Testors and Estwing. Because of this difference, Metalcrafters was disqualified as an experimental group. An acceptable replacement for this experimental group could not be identified.

In Arizona and California, where field tests were conducted in medical settings, experimental groups were drawn from the client populations of CIGNA Health Plan offices in Phoenix, Arizona, and Santa Ana, California. The flow of clients through the CIGNA office responsible for conducting HRA programs provided the treatment groups. Assignment to a particular treatment group was based on the time required to obtain 300 safety belt observations at each data collection point (i.e., baseline, post-screening, post-counseling, and delayed post-counseling) for both treatment groups. Approximately two months was required to obtain the desired sample sizes for the HRA Only group at both sites. The HRA Only group was followed by a group receiving HRA with supplemental educational materials (the GAHP). Project funds did not allow the completion of field testing in either Arizona or California. Desired data sample sizes were only achieved for the HRA Only group in Arizona. Data for the HRA With Education group was incomplete in

Table 6

EXPERIMENTAL GROUP CHARACTERISTICS IN PENNSYLVANIA AND ILLINOIS

Characteristics	Experimental Groups in Pennsylvania			Experimental Groups in Illinois		
	Boyertown Casket Co. (HRA with Education)	Atlas Mineral & Chemical Co. (HRA Only)	Wagner Electric Co. (Control)	Testor's (HRA with Education)	Metalcrafters (HRA Only)	Estwing (Control)
Number of Employees	460	107	588	200	180	200
Blue Collar/White Collar Percentages (Estimated)	81/19	56/44	91/9	80/20	80/20	80/20
Male/Female Percentages (Estimated)	70/30	77/23	67/33	15/85	60/40	50/50
Average Age (Estimated)	30	40	37	34	35	27
Predominant Level of Education	Completed High School	Completed High School	Completed High School	Completed High School	Completed High School	Completed High School
Baseline Safety Belt Use (Percent Belted)	9.5	15.1	8.8	17.2	36.4	19.9

Arizona and data were not collected in California for this group. Delayed post-counseling data were not collected in either field test.

Control groups in Arizona and California were drawn from clients receiving other services at the same CIGNA offices. Control group observations were made concurrently with treatment group observations. Separate control groups were observed for each treatment group. Control group safety belt observations were recorded for only those individuals who responded positively to a question on their willingness to undergo the CIGNA HRA program. This approach was used to assure similarity between treatment and control groups by eliminating individuals from the control group with no interest in participating in an HRA program. An informational brochure and a brief explanation of the HRA program was provided by the data collector to each potential control group subject. The explanation and query of interest followed the observation of an individual's safety belt status and therefore, did not bias the observation. Over 50 percent of the potential control group subjects indicated a willingness to participate in the CIGNA HRA program and, thus, were used to establish control group usage rates.

DATA COLLECTION PROCEDURES

Safety belt use data were collected by trained observers, stationed at strategic locations near each field test facility. A requirement for an acceptable test site facility was the existence of an exclusive parking area that was used by the individuals who participated in the HRA program. Observer stationing was typically at driveway access points to the parking lots that served the test facility. Subjects were not told of the evaluation aspect of the field test nor did they know that safety belt use was being recorded. When possible, arrangements were made with the test facility to isolate individuals who attended the HRA screening and counseling sessions.

Safety belt use observations were recorded on the data collection form shown in Figure 5. Information was recorded on the date, time, location, weather, and observer. The primary observation was the observed driver safety belt status. As each vehicle was observed, a checkmark was recorded on the form to indicate whether the driver was belted or not belted. Whenever possible, observations were

SAFETY BELT OBSERVATION FORM

Page _____

Date: / /

Start Time: am pm

End Time: am pm

Location: _____

Weather: CLEAR/CLOUDY RAIN SNOW

Observer: _____

No.	Driver			Adult Front Seat Passenger		
	Belted	Not Belted	Unsure	Belted	Not Belted	Unsure
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
Page Total						

Instructions: Place a check (✓) in the appropriate column to show if the driver was observed wearing a safety belt. If there are other front seat adult passengers and if you have time, place a check (✓) to show if they were observed wearing safety belts. Use one check for each additional front seat passenger. **DON'T GUESS**, if you are unsure, place a check (✓) in the "Unsure" column.

Figure 5

DATA COLLECTION FORM

made of vehicles entering the parking facility to avoid biases associated with "delayed buckling." However, at work sites, only exiting observations were possible. When the volume of vehicles to be observed exceeded the ability of the observer to use the data form in the intended manner, hand-held traffic counters were used to record the number of belted and unbelted drivers. If the observer was unsure of the safety belt status, a mark was made in the "unsure" column. If the vehicle contained other adult front seat passengers, the safety belt status for these passengers was recorded.

Field observers were recruited and trained locally. The number of observers at a particular test facility varied depending on the physical characteristics of the parking area and the number of driveways to be monitored. Observer training consisted of both classroom and field training. Classroom training consisted of the following topics.

- o Background of the research study
- o Need for data accuracy and completeness
- o Observer responsibilities
- o Observer safety and security during observation periods
- o Data collection scheduling
- o Field protocol
- o Data collection techniques and procedures

Following classroom training, actual field data collection was conducted. Field training consisted of refining observation techniques and ensuring observer understanding of the data collection form and procedures.

Data Collection at Work Settings

HRA programs that formed the basis for work settings provided HRA screening and counseling in group sessions attended by members of a particular work force. Typically, counseling sessions were conducted two to three weeks following screening. Data collection was scheduled within one to two weeks prior to screening and counseling, and two to three months following counseling. Safety belt observations were conducted for all vehicles as each exited the work site parking lot after work on the scheduled data collection day. Cooperation was obtained from the

work sites that served as the control group so that observations could be conducted within a few days of each treatment group observation.

Because the HRA programs were attended on a voluntary basis, not all individuals within a test site facility attended both the screening and counseling sessions. Discussions with the HRA program providers indicated that attendance rates at screening and counseling were typically high. Typical participation rates of between 85 and 95 percent of the total work force was reported by the program providers for the screening session. However, a comparison of the number of individuals who voluntarily completed an HRA questionnaire to total employees indicates participation rates between 60 to 70 percent. Participation rates for the counseling sessions were estimated to range between 90 and 95 percent of those attending the screening session.

Arrangements were made through the HRA program providers to conduct prize drawings at each company that served as an HRA With Education treatment group. These prize drawings were conducted by the management of each company and required the completion of the 21-day safety belt use log for eligibility in the drawing. The completed logs, signed by an employee, were used in the prize drawing. Drawings were held three to four weeks following HRA counseling and consisted of the prize amounts of \$100, \$50, and \$25. Delayed post-counseling observations of safety belt use were made one to two months following the prize drawing. A review of completed safety belt logs indicated an extremely high completion rate, likely due to the eligibility requirements for entry in the prize drawing. Also, the completed logs indicated an extremely high usage rate, much higher than observed usage rates. (In only a few cases did an individual indicate that a trip was made without safety belts.)

Data Collection at Medical Settings

HRA programs administered by CIGNA in Arizona and California were conducted on a one-to-one basis. HRA programs were administered from a local CIGNA office facility, which also provided CIGNA clients with other services such as dental care and prescription services. Because of the multiple destinations within a CIGNA office, procedures were developed to identify the destination of a client following the observation of an individual's safety belt status.

Data collection required two observers. At the beginning of each data collection day, a data collector reviewed the schedule of appointments for individuals who were scheduled to receive either HRA screening or HRA counseling. Beginning approximately 20 minutes before a scheduled appointment, the data collector observed and recorded the safety belt status of drivers of all vehicles entering the CIGNA parking lot. Typically, data were collected five days per week between 7:30 a.m. and 3:30 p.m. Along with the observation, a descriptive characteristic of the individual or the individual's vehicle was recorded on the data collection form. With the assistance of a second data collector and the CIGNA receptionist, the destination of the individual was determined. Thus, a determination was made as to whether the individual was destined for HRA screening, HRA counseling, or another (non-HRA) CIGNA service. For individuals who received a CIGNA service other than the HRA program, they were asked by the data collector if they had ever participated in an HRA program (as the individual returned to his/her vehicle). If the individual responded positively, they were not considered as a control group subject. If the individual responded negatively, a follow-up question was asked regarding the interest of the individual to participate in the CIGNA HRA program. The individual was provided with a brief description of the HRA program and was provided with a CIGNA brochure describing the program. If the individual stated an interest in participating in the HRA program, that individual was considered to be a control group subject and the prior safety belt observation was assigned to the control group.

The above data collection procedure was applied in a longitudinal fashion by first observing treatment group subjects arriving for HRA screening. Appointment schedules were monitored to determine when individuals began to return for HRA counseling. After the initial weeks of data collection for HRA screening subjects, observations were made simultaneously for subjects receiving HRA screening, HRA counseling, and control group subjects. This procedure resulted in maximizing the probability of observing the same treatment groups as they progressed from screening to counseling. The first 300 safety belt observations of screening and counseling subjects represented the HRA Only treatment group. Following the attainment of the desired sample size for the HRA Only group, the CIGNA staff were trained in administering the Great American Habit Plan. The data collection

procedure described above was then used to observe the HRA With Education treatment group and a corresponding control group. A prize drawing was conducted for the HRA With Education group in Phoenix following the completion of data collection.

Cooperation was obtained in Phoenix to schedule a "group meeting" of individuals who participated in the HRA program as either the HRA Only group or the HRA With Education group. The group meetings were not conducted, however, due to project funding limitations.

4. ANALYSIS RESULTS

ANALYSIS TECHNIQUES

The basic data for the statistical analysis of observed safety belt use are the frequencies representing the number of individuals who either use or do not use safety belts during a given time of observation. This binary response variable was collected at the specified observation times during the HRA programs for each experimental group which comprised the four field tests. The response variable and experimental design lends itself to analysis by categorical log-linear procedures. The statistical analysis performed for this study was based on the log-linear model for repeated measures on categorical data (Koch, 1977 and Guthrie, 1981). The hypothesis tested was whether or not the change in the percentage (rate) of safety belt use between two time periods was different when analyzed for pairs of experimental groups. These tests were restricted to pairs of experimental groups and pairs of observation times. For example, the approach was used to analyze the safety belt use rates between a treatment group and a control group for the observation pairs representing baseline and post-screening to determine the impact of HRA screening on observed safety belt use. A similar analysis was performed on baseline and the post-counseling periods to determine the combined impacts of HRA screening and HRA counseling. The statistical hypothesis was one of no interaction between experimental groups and observation times. The test statistic used in the analysis was the Chi square with one degree of freedom. The significance level for individual comparisons was based on the number of comparisons included in any particular group of comparisons using a Bonferroni probability rate for simultaneous inference. That is, to maintain an overall significance level of 0.05 for k tests in a group. The individual comparisons were made at the $0.05/k$ significance level.

In addition to the analysis of interactions for experimental groups and time periods, an analysis was conducted to test the significance of differences among the experimental groups at each observation time. A Chi square test was used to determine the significance of these differences. This allows for the identification of significant differences between treatment groups and control groups that can be attributed to a particular component of an HRA program (i.e., screening, counseling, and residual impacts). Since statistical tests were performed to ensure that there

were no differences between baseline safety belt rates of all experimental groups, statistical differences at subsequent times of observation indicate whether or not an element of the HRA program impacted the treatment groups relative to the control group.

Finally, self-reported safety belt use collected on the HRA questionnaire was obtained from the HRA providers and compared with observed safety belt use rates. This provides insights into the validity of self-reported safety belt use. This comparison was performed only for the Pennsylvania and Illinois field tests.

FIELD TEST RESULTS

Safety belt observations for each of the four field test are summarized in Figures 6 through 9. Data presented in the summary tables of each figure include the total number of observations (Base), the number of individuals observed wearing safety belts (Belted), and the percentage of the base observed to be belted (%), for each experimental group and time of observation. The data collection plan was fully implemented for field tests in Pennsylvania and Illinois which comprised the work site setting. However, the HRA Only treatment group in Illinois was eliminated due to statistical differences in baseline safety belt observations when compared to the control group baseline observation. Data collection activities in Arizona and California (medical settings) were not and analysis activities were performed on the incomplete databases. The ability to respond to the analysis objectives with certainty was in the medical setting field tests was severely limited.

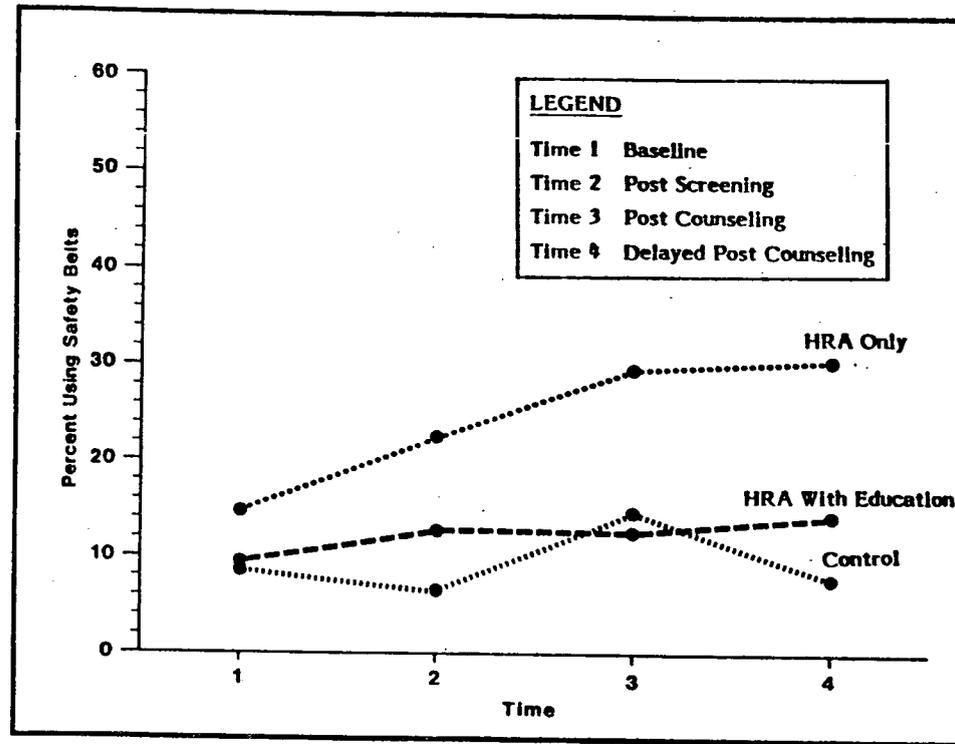
The following sections describe the results of the analysis of interactions and the analysis of experimental groups by time of observation. Results are presented separately for work site and medical setting field tests.

Work Site Field Tests

Time profiles and summary statistics showing the percentages of front seat passenger safety belt use, by observation period and experimental group are shown in Figures 6 and 7 for the Pennsylvania and Illinois field tests, respectively. Table 7 show the changes in observed safety belt use (expressed as a percent change from the baseline observation and adjusted for control group changes) for the treatment

Figure 6

PENNSYLVANIA SAFETY BELT USE TIME PROFILES



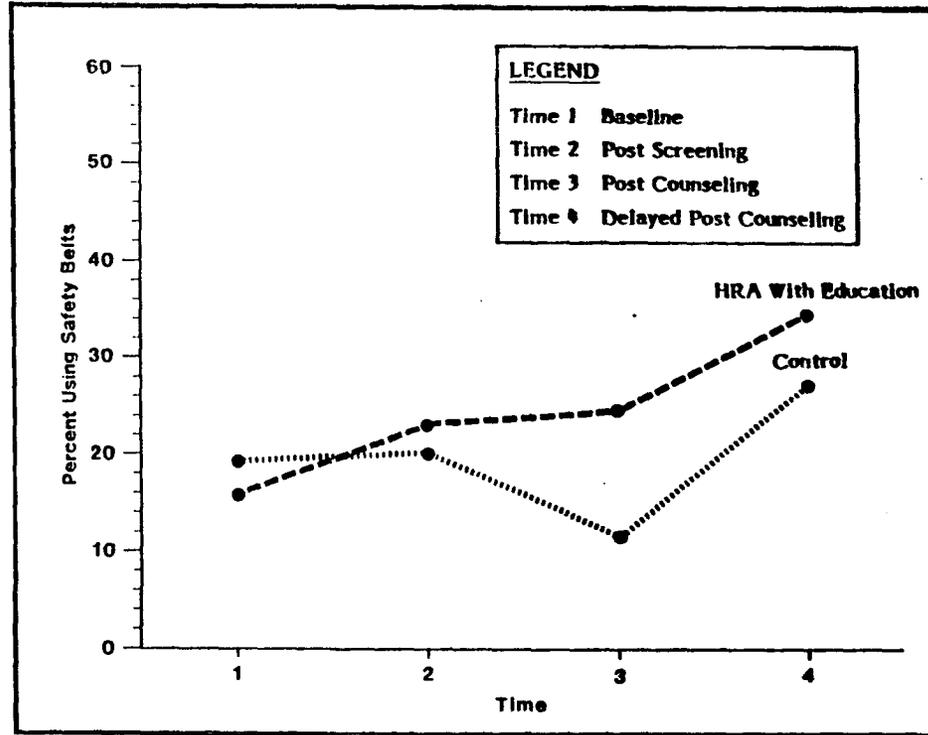
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SUMMARY OF SAFETY BELT OBSERVATIONS IN PENNSYLVANIA

Experimental Group	Company	Baseline				Screening Date	Post-Screening				Counseling Date	Post-Counseling				Delayed Post-Counseling			
		Base	Belted	%	Date		Base	Belted	%	Date		Base	Belted	%	Date	Base	Belted	%	Date
HRA With Education	Boyertown	294	28	9.5	2/4	4/10	321	41	12.8	5/7	5/20	366	46	12.6	6/19	385	55	14.3	9/17
HRA Only	Atlas	73	11	15.1	2/19	3/12	98	22	22.4	4/4	4/7	81	24	29.6	5/8	92	28	30.4	7/16
Control	Wagner	331	29	8.8	2/3	N/A	290	19	6.6	5/7	N/A	255	35	13.7	6/18	280	22	7.9	9/18

Figure 7

ILLINOIS SAFETY BELT USE TIME PROFILES



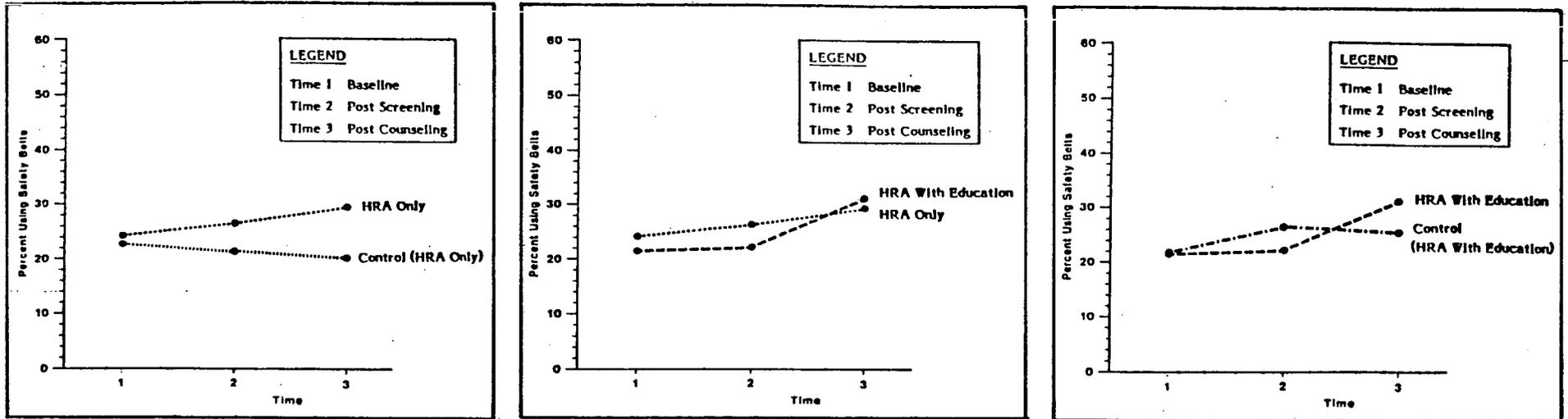
SUMMARY OF SAFETY BELT OBSERVATIONS IN ILLINOIS

Experimental Group	Company	Baseline				Screening Date	Post-Screening				Counseling Date	Post-Counseling				Delayed Post-Counseling			
		Base	Belted	%	Date		Base	Belted	%	Date		Base	Belted	%	Date	Base	Belted	%	Date
HRA With Education	Testors	198	34	17.2	3/26	4/15	124	29	23.4	4/28	4/29	141	35	24.8	6/2	124	43	34.7	7/16
HRA Only	Metalcrafters	129	47	36.4	3/25	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Control	Estwing	181	36	19.9	3/25	N/A	141	29	20.6	4/30	N/A	119	18	11.8	5/30	114	31	27.2	7/17

*Metalcrafters was eliminated due to significant differences with control baseline data.

Figure 8

ARIZONA SAFETY BELT USE TIME PROFILES



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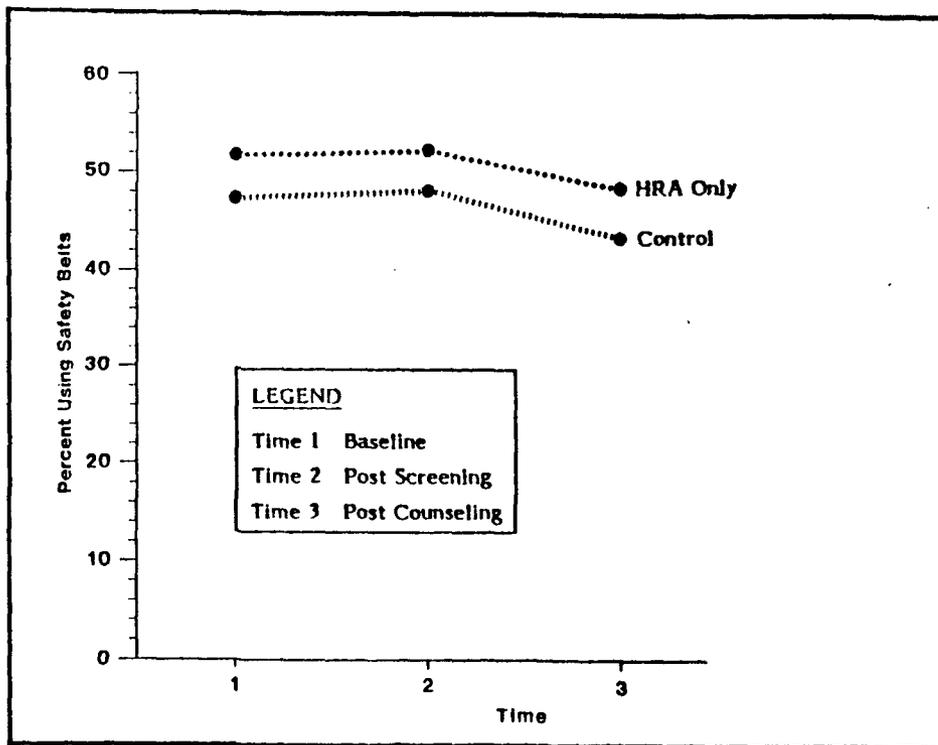
SUMMARY OF SAFETY BELT OBSERVATIONS IN ARIZONA

Experimental Group	Company	Baseline			Screening Dates	Post-Screening			Counseling Dates	Post-Counseling		
		Base	Belted	%		Base	Belted	%		Base	Belted	%
HRA Only	CIGNA-Phoenix	302	73	24.2	1/24-3/20	238	63	26.5	2/18-4/17	238	71	29.8
Control (HRA Only)	CIGNA-Phoenix	177	40	22.6	N/A	134	29	21.6	N/A	134	27	20.1
HRA With Education	CIGNA-Phoenix	238*	52	21.8	3/21-5/22	188*	42	22.3	4/18-5/22	188*	59	31.4
Control (HRA With Education)	CIGNA-Phoenix	182*	40	22.0	N/A	90*	24	26.7	N/A	90*	23	25.6

*Data collection activities not completed.

Figure 9

CALIFORNIA SAFETY BELT USE TIME PROFILES



SUMMARY OF SAFETY BELT OBSERVATIONS IN CALIFORNIA

Experimental Group	Company	Baseline			Screening Dates	Post-Screening			Counseling Dates	Post-Counseling		
		Base	Belted	%		Base	Belted	%		Base	Belted	%
HRA Only	CIGNA-Santa Ana	304	158	52.0	3/10-5/8	223*	117	52.5	3/20-5/16	223*	109	48.9
Control (HRA Only)	CIGNA-Santa Ana	456	218	47.8	N/A	354*	171	48.3	N/A	354*	155	43.8
HRA With Education	CIGNA-Santa Ana	*	*	*	*	*	*	*	*	*	*	*
Control (HRA With Education)	CIGNA-Santa Ana	*	*	*	N/A	*	*	*	N/A	*	*	*

*Data collection activities not completed.

Table 7

**CHANGES IN OBSERVED SAFETY BELT USE
IN PENNSYLVANIA AND ILLINOIS
(Compared to Baseline Observation
and Adjusted for Control Group Changes)**

<u>Treatment Group</u>	<u>Baseline Use (%)</u>	<u>Percent Change at Indicated Period</u>		
		<u>Post- Screening</u>	<u>Post- Counseling</u>	<u>Delayed Post- Counseling</u>
Pennsylvania				
HRA With Education	9.5	+79.6*	-14.8	+67.7*
HRA Only	15.1	+97.8*	+25.9	+124.3*
Illinois				
HRA With Education	17.2	+31.4*	+143.2*	+47.6*
HRA Only	36.5	---	---	---

* Indicates significant change in safety belt use at the 0.05/k level of significance, where k is the number of tests in the analysis (see Appendix E for details).

groups in Pennsylvania and Illinois. The results of the statistical analysis procedures that support the observed changes in safety belt use are summarized below and test statistics are presented in Appendix E.

Effectiveness of HRA Only

An analysis of safety belt impacts for subjects participating in a typical HRA program within a work setting was possible only for the Pennsylvania field test. Observed safety belt use for the HRA Only treatment group increased from 15.1 percent at the baseline observation to 30.4 percent at the delayed post-counseling observation for an increase of 15.3 percent. This represents an increase of 124.3 percent when the observed change was adjusted for changes in the control group. This was observed to be a statistically significant increase in safety belt use (see Table 7). Statistically significant changes of 97.8 and 25.9 percent were observed following screening and counseling, respectively. Statistical analyses of the interactions indicate that the total HRA program (i.e., the combined effects of screening, counseling, and follow-up) and all but one of the individual HRA components resulted in a significant improvement in the response variable. The exception was HRA counseling (alone). A review of Figure 6, however, indicates that safety belt use increased by over 7 percent for the HRA Only treatment group between post-screening (Time 2) and post-counseling (Time 3). This increase was accompanied by a similar increase in the control group usage rate, thus negating the treatment group increase in a statistical sense. The observed increase in safety belt use is consistent with the findings of Merrill and Sleet (1984).

The analysis of differences between the HRA Only group and the control group at each observation period supported the findings stated above. This analysis indicated that significant differences existed between the treatment and control groups for the post-screening, post-counseling, and delayed post-counseling observations. (As stated earlier in the report, no significant differences existed between the baseline observations for the various experimental groups.)

Effectiveness of HRA With Education

Both work site field tests allowed an analysis of the effect of HRA With Education. Table 7 shows that, in Pennsylvania, observed safety belt use increased

from 9.5 percent to 14.3 percent (a 67.7 percent increase when adjusted for control group changes). In Illinois, observed rates increased by 47.6 percent (adjusted), the treatment group increasing from 17.2 to 34.7 percent between baseline and delayed post-counseling observations. The total HRA program resulted in a significant improvement in observed safety belt use in both Pennsylvania and Illinois. In addition, HRA screening was observed to result in significant safety belt increases in both field tests. The impacts of other individual components of the HRA program was inconsistent.

In Pennsylvania, a comparison between the two treatment groups indicated that HRA Only was more effective than HRA With Education (refer to Figure 6). This comparison was not possible in Illinois.

Medical Settings

The data collection procedure required to observe subjects in the medical setting field tests (in Arizona and California) resulted in staff requirements that exceeded the project budget. Data collection activities were, therefore, discontinued prior to completion. As a result, data for these field tests are incomplete and caution is advised on drawing conclusions from the data.

The time profiles for the Arizona and California field tests are shown in Figures 8 and 9, respectively. Table 8 shows the changes in observed safety belt use, adjusted for control group changes. The only part of the field test for which adequate data were available is the HRA Only group in Arizona. Figure 8 indicated that observed safety belt use for the HRA Only group increased from 24.2 percent (at the baseline observation) to 29.8 percent (for the post-counseling observation). This change represented an increase of 38.5 percent in the treatment group following the adjustment for control group changes (see Table 8). Statistical analysis of interactions indicated that the combined effect of screening and counseling, and the singular HRA components of screening and counseling, produced a statistically significant increase in observed safety belt use when compared with control group observations. Although data collection activities were not completed for the HRA With Education group, available data showed a 23.8 percent (adjusted) increase in safety belt use for this group (see Table 8). Also, there was a clear

Table 8

**CHANGES IN OBSERVED SAFETY BELT USE
IN ARIZONA AND CALIFORNIA
(Compared to Baseline Observation
and Adjusted for Control Group Changes)**

<u>Treatment Group</u>	<u>Baseline Use (%)</u>	<u>Percent Change at Indicated Period</u>		
		<u>Post- Screening</u>	<u>Post- Counseling</u>	<u>Delayed Post- Counseling</u>
Arizona				
HRA With Education	21.8	-15.7	+23.8	---
HRA Only	24.2	+14.6*	+38.5*	---
California				
HRA With Education	---	---	---	---
HRA Only	52.0	-0.1	+2.6	---

* Indicates significant change in safety belt use at the 0.05/k level of significance, where k is the number of tests in the analysis (see Appendix E for details).

indication that the combined effects of screening and counseling and the singular effect of the counseling component was producing significant increases in safety belt use at the time when data collection was discontinued. This finding is consistent with the level of effectiveness that resulted from the analysis of the HRA Only group. Also, no differential effects of HRA with and without education was evident.

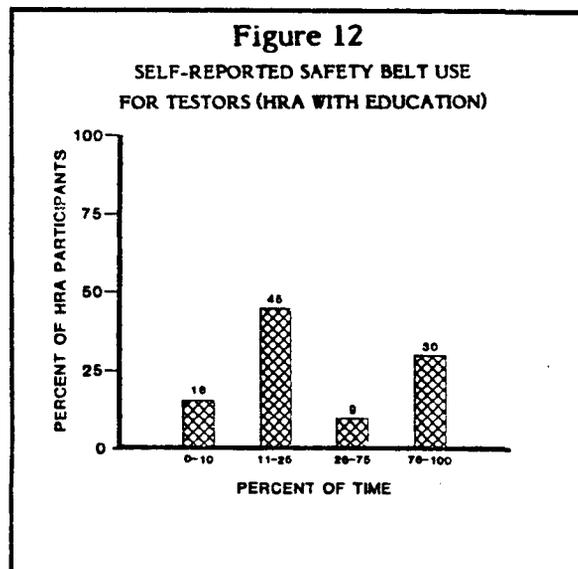
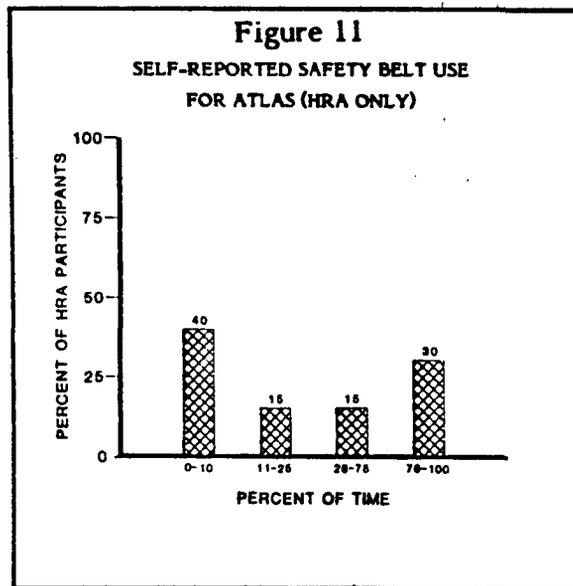
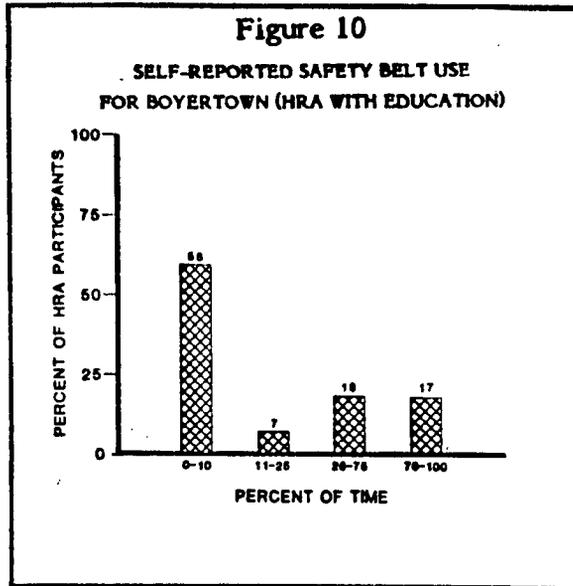
No conclusions could be drawn on the residual effects of the HRA programs because data collection, following the prize drawings, was not conducted. Similarly, data were insufficient to draw any conclusions from the field tests in California.

SELF-REPORTED SAFETY BELT USE

Self-reported safety belt use was obtained from the HRA program providers and summarized for the treatment groups in the work site settings. Similar data were not available from the medical settings. Self-reported use summaries for Boyertown and Atlas (in Pennsylvania) and Testors (in Illinois) are shown in Figures 10 through 12, respectively. A direct comparison of self-reported use and observed safety belt use was not possible due to the "prevalence" nature of self-reported data and the "point of prevalence" nature of observed data. It is, however, instructive to compare the percentage of observed safety belt use at the baseline observation with the percentage of individuals reporting a use of 76 to 100 percent at the time of HRA screening. The following table summarizes this comparison for the three field test facilities shown in Figures 10 through 12.

Table 9
COMPARISON OF SELF-REPORTED AND OBSERVED SAFETY BELT USE

<u>Company</u>	<u>Self-Reported Use (76-100%)</u>	<u>Observed Use</u>	<u>Ratio of Self-Reported to Observed</u>
Boyertown	17%	9.5%	1.8:1
Atlas	30%	15.1%	2.0:1
Testors	30%	17.2%	1.7:1



This comparison indicated that self-reported safety belt use for individuals that represent the blue-collar work sites in Pennsylvania and Illinois was typically twice that of observed safety belt use, assuming the observed use represents typical safety belt use of an individual.

SUMMARY OF FINDINGS AND CONCLUSIONS

The analysis produced several strong findings that support the hypothesis that HRA programs are capable of producing a positive behavior change related to the use of safety belts. Analysis questions for which analyses could not be performed or for which the analysis produced inconclusive results include: 1) incremental effectiveness of the GAHP educational materials over that level achieved from HRA alone, 2) the differential effects of HRA in states with and without mandatory safety belt use laws, and 3) the effectiveness of HRA in medical settings. (However, the analysis provides strong indications that HRA does produce an increase in observed safety belt use in medical settings.)

The key findings and conclusions of the field test analyses are summarized below.

- o The analysis clearly indicates that HRA programs are effective in increasing safety belt use. HRA programs resulted in statistically significant increases in safety belt use for each of three treatment groups in work settings and one treatment group in a medical setting. There were no groups that underwent HRA programs that did not result in significant increases in safety belt use (of those groups for which data collection was completed and sufficient for analysis).
- o The analysis did not produce conclusive results on the contributory impacts of individual HRA components (screening or counseling) on safety belt use. This may indicate that it is the impact of the entire HRA program, i.e., the HRA process, that produces behavior change through repeated subject contacts and reinforcement on a wide range of health issues during screening and counseling as opposed to the incremental effectiveness of individual components.
- o The analysis did not produce evidence that the GAHP educational materials were effective in achieving increased safety belt use above the level that was achieved through HRA without the materials. This issue could not, however, be fully investigated due to the field test and analysis limitations described above. The concept used in the development of the GAHP was, however, considered by the HRA program providers to be highly useful as a complement to information currently presented in HRA

programs on behavior change, habits, and risk assessment. The time required to cover the materials contained in the GAHP was considered to be somewhat long when used in a one-on-one HRA program. In group programs, however, the additional time required to cover the GAHP could be scheduled in to the program and did not create time problems.

- o One opportunity was available to investigate the differential effectiveness of HRA in states with and without mandatory safety belt use laws. The analysis showed HRA with education to produce greater increases in safety belt use in a state with safety belt legislation (Illinois) than it did in a state with no mandatory use law. However, this difference cannot be attributed to the existence of such legislation with any degree of certainty.
- o Self-reported safety belt use obtained during HRA screening was consistently twice that of the observed safety belt use rate for work sites in Pennsylvania and Illinois. This finding supports the theory that self-reported characteristics tend to be exaggerated in comparison to actual conditions.

5. RECOMMENDATIONS AND RESEARCH NEEDS

RECOMMENDATIONS FROM FIELD TEST ACTIVITIES

The following recommendations and research needs relate to the outcome of the field tests conducted in this study.

Traffic Safety/Public Health Cooperation

Evidence now exists that HRA programs are effective tools for increasing observed safety belt use (within the limits of this study). Since the promotion of safety belts is a common objective of both traffic safety and public health, it is recommended that efforts be continued to combine techniques, materials, and concepts that have been successfully employed by each group in an attempt to improve the effectiveness of each group's efforts to promote safety belt use. This research study provides clear indications that such efforts can produce positive results in the promotion of safety belt use.

Use of HRA in Traffic Safety Programs

This study supports the hypothesis that HRA programs are effective tools for increasing safety belt use. However, HRA programs, due to the emphasis on health and medical issues, are not feasible for implementation by traffic safety program providers. A category of HRA which is feasible for implementation is the self-scored HRA.

It is recommended that demonstration projects be established for testing the effectiveness of self-scored HRA's on safety belt use within traffic safety programs. Table 5 on Page 25 lists the self-scored HRA instruments reviewed during the study and the extent to which motor vehicle safety information is contained in each. All of the HRA's listed in Table 5 contain the two key motor vehicle safety elements: (1) safety belt use, and (2) alcohol consumption. Therefore, any of the listed HRA's are appropriate for the recommended application. However, on the basis of availability, ease of application, and attractiveness of the HRA package, the following self-scored HRA's are recommended.

- o Healthstyle - A Self-Test, U.S. Department of Health and Human Services
- o The Longevity Game, Northwestern Mutual Life
- o Your Lifestyle Profile, Health and Welfare - Canada
- o Lifescore For Your Health, Center for Consumer Health Education
- o Health Graph, University of Rhode Island Health Services
- o Your Personal Prevention Report Card, Rodale Press

Information on the availability and contents of self-scored HRA's are provided in Appendix B.

Self-scored HRA's have the greatest potential for use by safety program providers who typically do not possess the skills, training, and experience necessary to conduct HRA programs in accordance with SPM guidelines (refer to Appendix A). Self-scored HRA's are general awareness and information tools and are not considered to be "true" HRA's in the strictest sense. As such, the SPM guidelines are not specifically intended to control the administration of self-scored HRA's. However, because self-scored HRA's contain personal health elements, it is strongly recommended that public health professionals be available to respond to non-safety issues during the presentation and interpretation of self-scored HRA's. Acceptance of the HRA by traffic safety program providers should be evaluated.

Use of the GAHP by HRA Program Providers

Even though it was not possible to determine the incremental effectiveness of the GAHP over that achieved by a standard HRA program, the materials were observed to be well-received by HRA program providers and were highly relevant and complementary for use in the program field tests.

It is recommended that the GAHP be distributed for use by HRA program providers through channels such as the HRA Advisory Committee or the Society for Prospective Medicine. The GAHP provides needed information and activities on the subject of safety belt use which fills an informational gap perceived by many HRA program providers. Efforts should also be made to implement a mechanism to receive feedback from those providers who use the GAHP on such topics as:

methods of integration, utility and relevance of the materials, effectiveness of the materials on safety belt use, and suggestions for improving the materials.

Use of the GAHP in Traffic Safety Programs

The GAHP presents safety belt information and promotes safety belt use in a manner which varies from traditional materials used in traffic safety programs.

It is recommended that the concepts and materials used in the GAHP be modified for application in a non-HRA environment. This may involve only the modification of the risk appraisal element activity which is directly tied to the output from HRA screening. The resulting materials would be appropriate for use within a traffic safety program and may be supplemented by a self-scored HRA. Initial uses of the materials should be evaluated for utility, relevance, and effectiveness.

Research Needs

Continued development and testing of educational materials and techniques to promote the voluntary use of safety belts is desirable from two perspectives. First, evaluations of the effectiveness of mandatory safety belt use laws clearly indicate the need for continued education (and enforcement) to maintain the high levels of safety belt use achieved immediately after legislation. Second, it is likely that not all states will enact mandatory use laws and other states may rescind current laws on safety belt use. This study and others indicate that safety belt materials, when presented in the context of a health behavior that results in risk reduction, has the potential for increasing safety belt use along with other proven techniques for safety belt promotion.

Other research needs resulting from this study include the evaluation of HRA programs and educational materials in settings; such as, medical, school, and community.

RECOMMENDATIONS ON HRA INSTRUMENTS AND PROGRAMS

The following recommendations resulted from the survey of HRA instruments and programs.

Changing HRA Risk Factor Weighting

Consideration should be given to altering the existing risk factor structure for safety belt use so that "always wearing a safety belt" is appraised as average behavior. Nonuse of safety belts would then carry a higher-than-average risk factor. This change would provide substantiation for stronger safety belt use messages and emphasis in an HRA.

Updating HRA With Latest Motor Vehicle Accident Contributing Risks

HRA program developers and vendors should incorporate the changes in contributing risks for motor vehicle accidents (and their corresponding risk factors) as recommended by Breslow et al., (1985) in the Risk Factor Update Project: Final Report.

Supplementing Safety Belt Messages in Existing HRA's

HRA program providers, in conjunction with traffic safety professionals, should develop supplemental materials to communicate the appraised risks and achievable benefits of improving safety belt use habits. An excellent example is the development of an appraisal supplement for disabling injury risk that can be determined from motor vehicle accident death risk calculation in the HRA.

Enhancing HRA Motor Vehicle Accident Death Risk Messages for Young Adults

To increase the impact on young adults, messages should be developed to translate the risk of dying in a motor vehicle to "years of potential life lost."

Research Needs

The following points summarize the major research needs identified in this study.

- o Evaluate the effects on safety belt use of the new interactive motor vehicle accident risk factors.
- o Assess the feasibility of restructuring risk factor tables to assign higher risk levels to nonsafety belt use.
- o Development of similar concepts and materials for use in drinking driver programs.

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APPENDIX A

Appendix A-1 Interpretation of the CDC Results Printout

Appendix A-2 Society for Prospective Medicine - Guidelines for Health Risk Appraisal/Reduction Systems.

Appendix A-1

INTERPRETATION OF CDC RESULTS PRINTOUT

The following discussion describes the statistical computations that form the basis for risk assessment for the HRA instrument and results printout developed by the Centers for Disease Control (CDC). Exhibits A-1 and A-2 show samples of the CDC questionnaire and results printout, respectively. The printout shown in Exhibit A-2 is for a white male, age 45.

The chart below is a reproduction of the top left portion of Exhibit A-2. The lung cancer and motor vehicle accident examples are from the "detail" on the right side of the Exhibit A-2.

HEALTH RISK APPRAISAL PROGRAM
YOUR HEALTH RISK DATA HAVE BEEN ANALYZED AND THE RESULTS ARE SUMMARIZED BELOW AS THEY RELATE TO THE 12 MOST FREQUENT CAUSES OF DEATH FOR WHITE MALES AGED 45 .

RANK	CAUSE OF DEATH	CHANCES OF DYING PER 100,000 WITHIN THE NEXT 10 YEARS			
		COL. 1 AVERAGE	COL. 2 APPRAISAL	COL. 3 ACHIEVABLE	COL. 2-COL. 3 DIFFERENCES
1	HEART ATTACK	2654	5467	1699	3768
2	LUNG CANCER	667	1001	800	200
3	CIRRHOSIS OF THE LIVER	415	830	415	415
4	SUICIDE	273	273	273	0
5	STROKE	252	378	252	126
6	NON-MOTOR VEHICLE ACCIDENTS	242	242	242	0
7	MOTOR VEHICLE ACCIDENTS	236	566	268	278
8	INTESTINAL CANCER	165	40	40	0
9	BRONCHITIS AND EMPHYSEMA	132	198	139	59
10	PNEUMONIA	99	109	89	20
11	HOMICIDE	99	50	50	0
12	DIABETES	87	78	50	27
	ALL OTHER CAUSES	2052	2052	2052	0
	ALL CAUSES OF DEATH	7373	11283	6389	4894

ACTUAL	45	APPRAISED	50.5	ACHIEVABLE	43.1	DIFFERENCE	7.4
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EXAMPLE OF QUANTITATIVE RESULTS PRINTOUT

(From Exhibit A-2)

Source: CDC Results Printout

Each column in the chart corresponds to the summary ages at the bottom. Actual (chronological) age 45 is used as the "Average" (Column 1). The "Total Appraised Risk" for any cause of death is multiplied by the number in the Average Column (Column 1) corresponding to that cause of death. The arithmetic product is entered in the Appraisal Column (Column 2) and indicates the present risk for the cause of death. The Total Achievable Risk of that cause of death is multiplied by the number in the Average Column (Column 1) to get the Achievable Risk Level for

(B) HEALTH RISK APPRAISAL

CDC/HRA Questionnaire

Health Risk Appraisal is a promising health education tool that is still in the early stages of development. It is designed to show how your individual lifestyle affects your chances of avoiding the most common causes of death for a person of your age, sex and race. It also shows how much you can improve your chances by changing your harmful habits. (This particular version is not valid for persons under 25 or over 65 years old and for persons who have had a heart attack or other serious medical problems.)

IMPORTANT: To assure protection of your privacy, do NOT put your name on this form. Make sure that you get your Health Risk Appraisal "Coupon" in your wallet or other safe place and insure that the number matches the number on this form. You must present your coupon to get your computer results.

PARTICIPANT NUMBER _____ 1 6

PLEASE ENTER YOUR ANSWERS IN THE EMPTY BOXES (Use numbers only)

1. SEX 1 Male 2 Female

2. RACE/ETHNICITY 1 White (Non-Hispanic origin) 2 Black (Non-Hispanic origin) 3 Hispanic 4 Asian or Pacific Islander 5 American Indian or Alaskan Native 6 Not sure

3. AGE (At Last Birthday) _____ Years Old

4. HEIGHT (Without Shoes) Example: 5 foot, 7 1/2 inches = (No Fractions)

5. WEIGHT (Without Shoes) _____ Pounds

6. TOBACCO 1 Smoker 2 Ex-Smoker 3 Never Smoked

(Smokers and Ex-smokers) Enter average number smoked per day in the last five years (ex-smokers should use the last five years before quitting)

Cigarettes Per Day _____
Pipes/Cigs Per Day (Smoke Inhaled) _____
Pipes/Cigs Per Day (Smoke Not Inhaled) _____

(Ex-smokers only) Enter Number of Years Stopped Smoking (Note: Enter 1 for less than one year) _____

7. ALCOHOL 1 Drinker 2 Ex-Drinker (Stopped) 3 Non-Drinker (for drinks less than one drink per week)

If you drink alcohol, enter the average number of drinks per week

Bottles of beer per week _____
Glasses of wine per week _____
Mixed drinks or shots of liquor per week _____

8. DRUGS/MEDICATION How often do you use drugs or medication which affect your mood or help you to relax?
 1 Almost every day 2 Sometimes 3 Rarely or Never

9. MILES Per Year as a driver of a motor vehicle and/or passenger of an automobile (10,000 - average) Thousands of miles

10. SEAT BELT USE (percent of time used) Example: about half the time =

11. PHYSICAL ACTIVITY LEVEL 1 Level 1 - little or no physical activity 2 Level 2 - occasional physical activity 3 Level 3 - regular physical activity at least 3 times per week

NOTE: Physical activity includes work and leisure activities that require sustained physical exertion such as walking briskly, swimming, hiking and carrying.

12. Did either of your parents die of a heart attack before age 60?
 1 Yes, One of them 2 Yes, Both of them 3 No 4 Not sure

13. Did your mother, father, sister or brother have diabetes?
 1 Yes 2 No 3 Not sure

14. Do YOU have diabetes? 1 Yes, not controlled 2 Yes, controlled 3 No 4 Not sure

15. Rectal problems (other than piles or hemorrhoids)

Have you had Rectal Growth? 1 Yes 2 No 3 Not sure

Rectal Bleeding? 1 Yes 2 No 3 Not sure

Annual Rectal Exam? 1 Yes 2 No 3 Not sure

7

8

9-10

11-13

14-16

17

18-19

20-21

22-23

24-25

26

27-28

29-30

31-32

33

34-38

39-41

42

43

44

45

46

47

48

(Continued on Other Side)

16. Has your physician ever said you have Chronic Bronchitis or Emphysema? 1 Yes 2 No 3 Not sure

17. Blood Pressure (If known - otherwise leave blank) _____
Systolic (High Number) _____
Diastolic (Low Number) _____

18. Fasting Cholesterol Level (If known - otherwise leave blank) _____ MG/DL

19. Considering your age, how would you describe your overall physical health?
 1 Excellent 2 Good 3 Fair 4 Poor

20. In general how satisfied are you with your life?
 1 Mostly Satisfied 2 Partly Satisfied 3 Mostly Disappointed 4 Not Sure

21. In general how strong are your social ties with your family and friends?
 1 Very strong 2 About Average 3 Weaker than average 4 Not sure

22. How many hours of sleep do you usually get at night?
 1 6 hours or less 2 7 hours 3 8 hours 4 9 hours or more

23. Have you suffered a serious personal loss or misfortune in the Past Year? (For example, a job loss, disability, divorce, separation, jail term, or the death of a close person)
 1 Yes, one serious loss 2 Yes, Two or More serious losses 3 No

24. How often in the Past Year did you witness or become involved in a violent or potentially violent argument?
 1 4 or more times 2 2 or 3 times 3 Once or never 4 Not sure

25. How many of the following things do you usually do?
 1 3 or more 2 1 or 2 3 None 4 Not sure

- Hitch-hike or pick up hitch hikers
- Carry a gun or knife for protection
- Keep a gun at home for protection
- Criticize or argue with strangers
- Live or work at night in a high crime area
- Seek entertainment at night in high-crime areas or bars

26. Have you had a hysterectomy? (Women only) 1 Yes 2 No 3 Not sure

27. How often do you have Pap Smear? (Women only)
 1 At least once per year 2 At least once every 3 years 3 More than 3 years apart 4 Have never had one 5 Not sure 6 Not applicable

28. Was your last Pap Smear Normal? (Women only) 1 Yes 2 No 3 Not sure 4 Not applicable

29. Did your mother, sister or daughter have breast cancer? (Women only) 1 Yes 2 No 3 Not sure

30. How often do you examine your breasts for lumps? (Women only)
 1 Monthly 2 Once every few months 3 Rarely or never

31. Have you ever completed a computerized Health Risk Appraisal Questionnaire like this one?
 1 Yes 2 No 3 Not sure

32. Current Marital Status 1 Single (Never married) 2 Married 3 Separated 4 Widowed 5 Divorced 6 Other

33. Schooling completed (One choice only) 1 Did Not graduate from high school 2 High School 3 Some College 4 College or Professional Degree

34. Employment Status 1 Employed 2 Unemployed 3 Homemaker, Volunteer, or Student 4 Retired, Other

35. Type of occupation (SKIP IF NOT APPLICABLE)
 1 Professional, Technical, Manager, Official or Proprietor 2 Clerical or Sales 3 Craftsman, Foreman or Operative 4 Service or Laborer

36. County of Current Residence (SKIP IF NOT KNOWN)

<input type="text" value="4"/> <input type="text" value="2"/> <input type="text" value="1"/> FULTON	<input type="text" value="0"/> <input type="text" value="8"/> <input type="text" value="3"/> DEKALB
<input type="text" value="0"/> <input type="text" value="6"/> <input type="text" value="7"/> COBB	<input type="text" value="0"/> <input type="text" value="6"/> <input type="text" value="3"/> CLAYTON
<input type="text" value="1"/> <input type="text" value="3"/> <input type="text" value="5"/> GWINNETT	<input type="text" value="0"/> <input type="text" value="5"/> <input type="text" value="9"/> CLARK
<input type="text" value="0"/> <input type="text" value="0"/> Other	

37. State of Current Residence 1 3 GEORGIA 3 9 Other

49

50-52

53-55

56-58

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76-78

79-80

CDC 304-4-1 (1/83)

A-2

Exhibit A-1
CDC QUESTIONNAIRE

HEALTH RISK APPRAISAL PROGRAM

YOUR HEALTH RISK DATA HAVE BEEN ANALYZED AND THE RESULTS ARE SUMMARIZED BELOW AS THEY RELATE TO THE 12 MOST FREQUENT CAUSES OF DEATH FOR WHITE MALES AGED 45 .

RANK	CAUSE OF DEATH	CHANCES OF DYING PER 100,000 WITHIN THE NEXT 10 YEARS			
		COL. 1 AVERAGE	COL. 2 APPRAISAL	COL. 3 ACHIEVABLE	COL. 2-COL. 3 DIFFERENCES
1	HEART ATTACK	2654	5467	1699	3768
2	LUNG CANCER	667	1001	800	200
3	CIRRHOSIS OF THE LIVER	415	830	415	415
4	SUICIDE	273	273	273	0
5	STROKE	252	378	252	126
6	NON-MOTOR VEHICLE ACCIDENTS	242	242	242	0
7	MOTOR VEHICLE ACCIDENTS	236	566	288	278
8	INTESTINAL CANCER	185	40	40	0
9	BRONCHITIS AND EMPHYSEMA	132	198	139	59
10	PNEUMONIA	99	109	89	20
11	HOMICIDE	99	50	50	0
12	DIABETES	87	78	50	27
	ALL OTHER CAUSES	2052	2052	2052	0
	ALL CAUSES OF DEATH	7373	11283	6389	4894

ACTUAL APPRAISED ACHIEVABLE DIFFERENCE
 AGE: 45 50.5 43.1 7.4

FOR HEIGHT 70 INCHES AND MEDIUM FRAME, 185 LBS. IS APPROXIMATELY 19% OVERWEIGHT . . . DESIRABLE WEIGHT IS 155 LBS.

- AVERAGE CHANCES OF DYING ARE BASED ON 1975-1977 U. S. MORTALITY DATA. (CDC VERSION 2.1)
- APPRAISED AGE (OR 'HEALTH AGE') IS AN ESTIMATE OF HOW HEALTHY YOU ARE COMPARED TO OTHERS OF YOUR RACE AND SEX.
- ACHIEVABLE AGE IS AN ESTIMATE OF HOW HEALTHY YOU COULD BE BY MAKING THE CHANGES RECOMMENDED BELOW:

POSITIVE AREAS OF YOUR LIFESTYLE

LITTLE OR NO DRUG USE
ANNUAL RECTAL EXAM

RECOMMENDED LIFESTYLE CHANGES

PLAN A WAY TO GET MORE REGULAR EXERCISE THAT YOU ENJOY DOING
QUIT SMOKING (GET HELP IF NEEDED)
REDUCE YOUR WEIGHT WITH DIET, EXERCISE AND PROFESSIONAL HELP
SEEK PROFESSIONAL ASSISTANCE FOR YOUR ELEVATED BLOOD PRESSURE
REDUCE ALCOHOL USE TO ONE DRINK A DAY OR LESS
BUCKLE YOUR SEATBELT ALL OF THE TIME

- NOTE -- HOMICIDE RISK IS PARTLY BASED ON HIGH-RISK ACTIVITIES INCLUDING USE OF WEAPONS, ENCOUNTERS WITH STRANGERS AND THE AMOUNT OF CONTACT WITH HIGH-CRIME AREAS.
NOTE -- SUICIDE RISK IS PARTLY BASED ON ANSWERS TO QUESTIONS ABOUT PHYSICAL HEALTH, LIFE SATISFACTION, SOCIAL TIES, HOURS OF SLEEP, RECENT LOSS OR MISFORTUNE AND MARITAL STATUS.

Exhibit A-2

CDC RESULTS PRINTOUT

CAUSE OF DEATH	CONDITION	APPRAISAL			ACHIEVABLE		
		AS APPRAISED	PARTIAL RISK	TOTAL RISK	ACHIEVED	PARTIAL RISK	TOTAL RISK
HEART ATTACK	BLOOD PRESSURE	150/ 95	1.0/1.4		140/ 88	0.8/1.1	
	DIABETES	NOT DIABETIC	0.9		NOT DIABETIC	0.9	
	WEIGHT	185	1.1		160	0.9	
	ACTIVITY LEVEL	MINIMUM	1.0		EXERCISE PROGRAM	0.6	
	SMOKING	SMOKES 20 OR MORE	1.5		STOPPED SMOKING	0.7	
	FAMILY HISTORY	YES	1.2	2.06	YES	1.2	0.64
LUNG CANCER	SMOKING	SMOKES 20 OR MORE	1.5	1.50	STOPPED SMOKING	1.2	1.20
CIRRHOSIS OF THE LIVER	ALCOHOL	7-24 DRINKS PER WEEK	2.0	2.00	3-6 DRINKS PER WEEK	1.0	1.00
SUICIDE	DISTRESS	AVERAGE RISK	1.0		AVERAGE RISK	1.0	
	ALCOHOL	7-24 DRINKS PER WEEK	1.0	1.00	3-6 DRINKS PER WEEK	1.0	1.00
STROKE	BLOOD PRESSURE	150/ 95	1.0/1.4		140/ 88	0.8/1.1	
	DIABETES	NOT DIABETIC	0.9		NOT DIABETIC	0.9	
	SMOKING	SMOKES 20 OR MORE	1.2	1.50	STOPPED SMOKING	1.0	1.00
MOTOR VEHICLE ACCIDENTS	ALCOHOL	7-24 DRINKS PER WEEK	2.0		3-6 DRINKS PER WEEK	1.0	
	MILES PER YEAR	15000	1.5		15000	1.5	
	SEATBELT	10-24%	1.0		75-100%	0.8	
	DRUG USE	RARELY OR NEVER	0.9	2.40	RARELY OR NEVER	0.9	1.22
INTESTINAL CANCER	RECTAL GROWTH	HAS NOT HAD	0.9		HAS NOT HAD	0.9	
	RECTAL EXAM	ANNUAL EXAM	0.3		ANNUAL EXAM	0.3	
	RECTAL BLOOD	NO BLOOD IN STOOL	0.9	0.24	NO BLOOD IN STOOL	0.9	0.24
BRONCHITIS AND EMPHYSEMA	SMOKING	SMOKES 20 OR MORE	1.5	1.50	STOPPED SMOKING	1.0	1.05
PNEUMONIA	ALCOHOL	7-24 DRINKS PER WEEK	1.0		3-6 DRINKS PER WEEK	1.0	
	SMOKING	SMOKES 20 OR MORE	1.2		STOPPED SMOKING	1.0	
	EMPHYSEMA	DOES NOT HAVE	0.9	1.10	DOES NOT HAVE	0.9	0.90
HOMICIDE	VIOLENT EVENT	SAW OR IN 0-1/YEAR	0.5		SAW OR IN 0-1/YEAR	0.5	
	LIFESTYLE	AVERAGE RISK	1.0	0.50	AVERAGE RISK	1.0	0.50
DIABETES	WEIGHT	185	1.0		160	0.6	
	FAMILY HISTORY	NO	0.9	0.89	NO	0.9	0.58

- RISK FACTORS ADAPTED FROM 'HOW TO PRACTICE PROSPECTIVE MEDICINE' DRs. ROBBINS AND MALL, METHODIST HOSPITAL OF INDIANA, 1970.
- COMPUTER PROGRAM DEVELOPED BY THE CENTERS FOR DISEASE CONTROL (CDC), DHHS, ATLANTA GEORGIA. THE PROGRAM WAS ADAPTED TO RUN ON A MICROCOMPUTER BY CDC AND ADVANCED MEDICAL SYSTEMS, INC., LEAVENWORTH KANSAS. (CDC Version 2.1)

NOTE: HEALTH RISK APPRAISAL IS STILL IN ITS EARLY STAGES OF DEVELOPMENT. ITS MAIN VALUE IS ITS POTENTIAL FOR SHOWING THE HEALTH AND SAFETY RISKS ASSOCIATED WITH COMMON LIFESTYLE FACTORS. HOWEVER, IT DOES NOT INCLUDE ALL PERSONAL RISKS AND PROTECTIVE FACTORS, AND - IN PARTICULAR - DOES NOT INCLUDE MOST OCCUPATIONAL RISKS AND ENVIRONMENTAL FACTORS. SINCE IT IS A DEVELOPMENTAL PROGRAM, IT SHOULD BE INTERPRETED BY A QUALIFIED HEALTH PROFESSIONAL.

--PLEASE NOTE-- THE ABOVE ANALYSIS IS INCOMPLETE DUE TO MISSING ANSWERS TO CERTAIN QUESTIONS. THESE QUESTIONS CONCERN THE FOLLOWING CONDITIONS:

CHOLESTEROL

Exhibit A-2 (Continued)
 CDC RESULTS PRINTOUT

that cause of death (Column 3). The difference between Column 2 and Column 3 is entered in the last column. The "All Causes of Death" sum at the bottom of each column gives the numbers that need to be looked up in the Mortality Tables that correspond to Appraised Age and Achievable Age. In this case, they are 50.5 and 43.1, respectively.

To understand the Appraised and Achieval Risk for a specific cause of death, Lung Cancer, refer to the printout excerpt below. Keep in mind that 1.0 = average; less than 1.0 is better than average; greater than 1.0 is worse than average.

CAUSE OF DEATH	CONDITION	APPRAISAL			ACHIEVABLE		
		AS APPRAISED	PARTIAL RISK	TOTAL RISK	ACHIEVED	PARTIAL RISK	TOTAL RISK
LUNG CANCER	SMOKING	SMOKES 20 OR MORE	1.5	1.50	STOPPED SMOKING	1.2	1.20

LUNG CANCER RISK
(From Exhibit A-2)

Source: CDC Results Printout

Lung cancer has only one contributory risk, smoking. Below are the numeric weights assigned to smoking various amounts for a 45 year old male:

Smoking Habits	Daily Average
40 (2 packs)	2.0
20 (1 pack)	1.5
10 (1/2 pack)	1.1
Under 10	.8

This sample male "smokes 20 or more" giving a risk of 1.5. As there is only one contributing risk, that then is the risk for lung cancer. So, 1.5 means that this male is at one and a half times the average risk for lung cancer within the next ten years. If he stops smoking, his risk is lowered to 1.2.

Going back to the chart, observe that Lung Cancer Average (Column 1) is 667. That represents average, 1.0, deaths for a 45 year old male. Multiplying 667 X 1.5 (appraised risk) = 1001, the estimated chances of dying in the Appraisal (Column 2)

Achievable estimate is calculated $667 \times 1.2 = 800$ —still above average, but much better. Each year he does not smoke his achievable risk gets better.

However, this same principal and method can be applied to motor vehicle accident risk. For motor vehicle accident risk, there are four contributing factors each weighted according to degree of risk.

CAUSE OF DEATH	CONDITION	APPRAISAL			ACHIEVABLE		
		AS APPRAISED	PARTIAL RISK	TOTAL RISK	ACHIEVED	PARTIAL RISK	TOTAL RISK
MOTOR VEHICLE ACCIDENTS	ALCOHOL	7-24 DRINKS PER WEEK	2.0		3-6 DRINKS PER WEEK	1.0	
	MILES PER YEAR	15000	1.5		15000	1.5	
	SEATBELT	10-24%	1.0		75-100%	0.8	
	DRUG USE	RARELY OR NEVER	0.9	2.40	RARELY OR NEVER	0.9	1.22

MOTOR VEHICLE ACCIDENT RISK PRINTOUT
(From Exhibit A-2)

Source: CDC Results Printout

In this case, the "miles per year" and "drug use" are the same for both Achievable and Appraised. They are assumed to be at optimal level for this individual. Achievable recommendations are made to reduce risk from alcohol and safety belts. Currently, the appraised risk for motor vehicle accident is 2.4 (almost two and a half times average risk). Achievable risk is 1.22, just a little above average (and due to the excess miles driven per year). From comparisons on Figure 5-1, it is demonstrated numerically that alcohol use has the most effect on total motor vehicle risk risk. Just as with lung cancer, the total risk for Appraisal and Achievable can be multiplied by the Average (Column 1) chances of death for motor vehicle accident, 242, to determine its specific cause of death risk. On the chart, now compare motor vehicle accident risk with other causes of death for the 45 year old male sample, and you can see that it represents only a small part of overall risk. Chances for a heart attack are about ten times greater. However, for males under 35, the proportion of overall risk attributable to motor vehicle accident is much greater.

The Society of Prospective Medicine

GUIDELINES FOR HEALTH RISK APPRAISAL/REDUCTION SYSTEMS

PURPOSE

The Society of Prospective Medicine is concerned with encouraging high standards in the application of programs of health risk appraisal and reduction. Accordingly it has set forth attributes which are considered essential to such programs.

The Guidelines are intended to assist not only individuals and organizations who are providing risk appraisal/reduction programs, but also individuals and organizations who are seeking to utilize such programs.

The Society does not intend to impose the Guidelines; rather it is hoped that they will be accepted voluntarily. The Society believes that their use will encourage providers to strive for excellence in the delivery of health risk appraisal/reduction programs.

The Guidelines will be presented in two parts, and will be updated periodically. The first part, immediately following, covers the minimum guidelines, or Essentials; the second, now under development, will include those attributes considered strongly desirable.

DEFINITIONS

Health Risk Appraisal/Reduction is the art and science of identifying an individual's present and potential health hazards and of helping him/her reduce those risks so as to extend useful life expectancy, improve the quality of life, and reduce morbidity and disability.

Health Risk Appraisal evaluates an individual's lifestyle/health behaviors, estimates his/her risk of death and/or illness, and estimates potential reduction in risk based on epidemiological data, mortality statistics, and actuarial techniques. Feedback is given to the individual based on his/her current and achievable risks.

Risk Appraisal Instruments are printed or computer-assisted questionnaires used to identify an individual's health risks.

Risk Reduction Programs are organized activities to reduce risk through sustained behavior change. These programs can be of long or short duration and of a broad or categorical nature.

Providers are the individuals, institutions, or organizations providing risk appraisal/reduction programs to individuals or groups of individuals.

Participants are the individuals whose health risks are being appraised and who may, if appropriate, participate in some components of a risk reduction program.

Essentials are the basic attributes that should be present in any program of risk appraisal/reduction. They remain the same for all programs, whether institutionally based or free-standing, whether limited to a one-month community cardiovascular risk program or as extensive as an industry-wide, ongoing health risk appraisal program.

ESSENTIALS

The following should be present in every program:

1. Written Statement of the Objectives of the Program, and Limitations. The statement should contain a concise, realistic definition of goals; the scope of the program (general health vs. categorical efforts); duration (ongoing vs. short-term); target audience; affiliation or sponsorship; and limitations.

2. Evidence of a Scientific Base for the Risk Appraisal Instrument. Evidence should include references to mortality and/or morbidity data bases from which the risk appraisal instrument is constructed; to the methodology for quantifying the risk factors; and to any studies regarding the relevance and validity of the risk appraisal instrument. An effort should be made to incorporate current "state-of-the-art" data and methods.

3. Evidence that Appropriate Risk Reduction Resources are Available to Participants. Risk reduction resources should have a scientific basis, to the extent possible, and should be culturally appropriate for the target participants. Resources should be made available consistent with the risk indicators appraised. For example, if lifestyle stress risks are included in the appraisal, resources should be available for stress reduction. The provider may offer its own programs or may identify community resources that serve the purpose. An effort should be made to incorporate current "state-of-the-art" data and methods.

4. Demonstration of Staff's Capability to Organize and Conduct Risk Appraisal/Reduction Programs in Accordance with Stated Objectives. Each program should be able to meet its objectives in terms of budget, facilities, staff, and consultants. The latter should have experience and/or training needed to promote the program, administer risk appraisal instruments in a valid manner, and interpret the results to participants so as to encourage optimal risk reduction activity. Providers should exemplify positive personal life styles coupled with professional commitment.

5. Evidence that Participants Receive the Results of Their Appraisals in a Form They can Comprehend, Including Recommendations to Consult an Appropriate Health Provider When Needed. Existence of an operating feedback loop is critical to the integrity and success of the program. The risk appraisal instrument must be understandable enough to get meaningful responses. The reporting of results and recommendations for risk reduction must be personalized, relevant, and understandable. If a medical or other serious health problem is detected, the participant should be notified and encouraged to consult a physician or other health provider. Follow-up

to monitor risk reduction compliance is also desirable.

6. Mechanisms to Protect the Confidentiality of the Data on Individual Participants. Only the participant, and health professionals authorized by the participant, should receive a copy of, or otherwise have access to, his/her own risk appraisal or results of risk reduction activity. Further release should be only by written consent. Aggregate data should be released with caution. If there is any risk of revealing participants' identities, written consent should also be obtained before releasing aggregate data.

7. Evidence of Efforts to Evaluate the Program Periodically in Relation to Objectives. Evaluation is a judgment about the program and its effectiveness in identifying and reducing health risk. It assesses the extent to which the program objectives have been met, for example, to observe whether the program has had an effect on the lifestyle of the participants. Evaluation also implies a review of program objectives in light of research in the field. There should be a plan for periodic evaluation, communication of the results, and action based thereon.

GUIDELINES ADVISORY PANEL

Sabina Dunton, MPH, Well Aware About Health,
Tucson, AZ

Lewis A Miller, MS, Miller Communications, Inc,
Norwalk, CT

Clifford J Harris, MD, INA Healthplan Inc,
Phoenix, AZ

Dale A Turner, MPH, San Francisco Dept Pub Hlth,
Tilburon, CA

Bill L Morris, Med Info Svc, Raytown, MO

Ron Skinner, Med Info Svc, St Charles, MO

Ron Rosenberg, PA-C, Inst Personal Hlth, Wash, DC

John H Milsum, ScD, U British Columbia,
Vancouver, Canada

Lloyd C Arnold, EdD, Johnson & Johnson,
New Brunswick, NJ

Ronald G Blankenbaker, MD, Indiana St Bd Hlth,
Indianapolis, IN

Charles B McClean, PhD, Applied Foresight,
Lewisville, TX

Donald D Johnson, MD, Sentry Insurance,
Stevens Point, WI

Michael Vesselago, MD, Edmonds, WA

Bill Hettler, MD, U Wisconsin, Stevens Pt, WI

Robert F Allen, PhD, Human Resources Inst,
Morristown, NJ

Robert J Werra, MD, Ukiah, CA

R John Young, PhD, Edw J Funk & Sons INC,
Kentland, IN

William Thompson, Medical Datamation,
Bellevue, OH

Don Hall, Computerized Hlth Appraisals,
Portland, OR

Ian McDowell, PhD, U Ottawa, Ottawa, Canada

David G Moriarty, Centers for Disease Control,
Atlanta, GA



**The Society
of
Prospective
Medicine**

These Guidelines for risk appraisal/reduction programs were developed by a Task Force of the Society of Prospective Medicine (SPM). Task Force members: Sabina Dunton, MPH, and Lewis A Miller, MS, CoChairmen; William Beery, MPH, Axel Goetz, MD MPH, and Jeff Leveton, MPH. The Guidelines were reviewed and revised by an Advisory Panel at the SPM Annual Meeting, August 30, 1981, and adopted by the SPM Board of Directors, September 2, 1981.

...dedicated to identifying actual and potential health hazards and to developing and implementing risk assessment techniques and risk reduction programs.

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APPENDIX B

SURVEY OF HRA INSTRUMENTS

SURVEY OF HRA INSTRUMENTS

In December of 1984, over 1,300 letters of inquiry were mailed to vendors of HRA's, coordinators of programs utilizing an HRA, and researchers and evaluators of HRA programs. The HRA's reviewed for this survey were categorized as follows:

- o Computer-scored HRA's, which are mailed to a central computer facility for batch processing; these are usually the more complex and detailed appraisals.
- o Microcomputer-based HRA's, which can be processed by a microcomputer at home, in schools, or in offices; some of these are interactive, meaning that the user can type responses directly into the microcomputer and results are displayed or printed immediately.
- o Self-scored questionnaires, which are usually brief and do not involve a computer; they are scored by the user. Most of these are not HRA's in the strictest sense, as they do not use the basic mortality risk tables for their scores.

Totals of 21, 3, and 11 HRA instruments were reviewed for the categories listed above, respectively. Exhibits B-1, B-2, and B-3 list the instruments reviewed during the study. This appendix contains summary descriptions of the instruments that were identified from responses to the letter of inquiry.

COMPUTER-SCORED HRA'S

These HRA instruments include a questionnaire (which gathers the personal health information) and a report (which is the computer printout giving the appraisal of an individual's risk). The report may present risk information in a narrative form, a numerical display form, graphically, or any combination of these forms. Exhibit B-4 was developed for ease of comparison among the computer-scored HRA's.

The computer-scored HRA's are further categorized into the following types:

- o Basic HRA's using Mortality Risk Calculations
- o Expanded Versions of Mortality-based HRA's
- o Point-Scored HRA's
- o Teen/Young Adult HRA Versions
- o "In-House" HRA Instruments

Exhibit B-1

COMPUTER-SCORED HRA'S

<u>Provider</u>	<u>Instrument Name</u>
Centers for Disease Control	CDC/Health Risk Appraisal
Control Data Corporation	Health Risk Profile
General Health	Personal Risk Profile
Health and Welfare Canada	Eval-U-Life
Institute for Lifestyle Improvement	Lifestyle Assessment Questionnaire
International Health Awareness Center	Pulse
Medical Datamation	Health 80's Questionnaire
Prospective Medicine Center	Health Hazard Appraisal
Regional Health Resource Center	RHRC Health Hazard Appraisal
Rhode Island Department of Health	Wellness Check
St. Louis County Health Department	Health Risk Appraisal Questionnaire
Straub Clinic	Health Potential Appraisal
University of California	Health Hazard Appraisal Questionnaire
Well Aware About Health	Your Health Risk Profile
Wellsource, Inc.	Life
Wisconsin Center for Health Risk Research	Health Risk Assessment Questionnaire
Centers for Disease Control	Teen Health Risk Appraisal
Rhode Island Department of Health	Teen Wellness Check
Boston University Medical Center	Self-Administered Health and Risk Assessment Questionnaire
Deaconess Hospital	Health Practices Survey
Duke University	New Patient Workup Form
Kimberly-Clark Corporation	Lifestyle Profile Questionnaire

Exhibit B-2

MICROCOMPUTER-BASED HRA'S

<u>Provider</u>	<u>Instrument Name</u>
Centers for Disease Control	CDC Adult HRA (Microcomputer Version)
Minnesota Educational Computing Corporation	Health Maintenance Amendment, Volume II
University of Minnesota	Health Risk Appraisal (UM-HRA)

Exhibit B-3

SELF-SCORED HRA'S

<u>Provider</u>	<u>Instrument Name</u>
Center for Consumer Health Education	Lifescore for Your Health
Health and Welfare Canada	Your Lifestyle Profile
Kansas Department of Health and Environment, Bureau of Health Education	P.L.U.S. to Your Life
Northwestern Mutual Life	The Longevity Game
Pima County Arizona Health Department	Adult Awareness Program
Rodale Press, Inc.	Your Personal Prevention Report Card
Texas Department of Health	Health Risk Profile and My Personal Health Profile
U.S. Department of Health and Human Services	Healthstyle, A self-Test
University of Rhode Island Health Services	Health Graph
Wellness Associates	Wellness Inventory (short form) Wellness Index (long form)
Wyoming Division of Health and Services	Healthstyle, A Self-Test for Seniors (Adoption of (H) U.S. DHHS "Health Style, A Self-Test")

Exhibit B-4

SUMMARY OF CHARACTERISTICS OF COMPUTER-SCORED HRA'S

<u>Target Group Provider</u> <u>HRA INSTRUMENT</u>	<u>Type</u>	<u>Number</u> <u>of</u> <u>Questions</u>	<u>Page</u> <u>Length</u>	<u>Is</u> <u>Color</u> <u>Used?</u>	<u>Are</u> <u>Graphs</u> <u>Used?</u>	<u>Printout Characteristics</u>			
						<u>Risk/</u> <u>Achievable</u> <u>Ages</u> <u>Given?</u>	<u>Are</u> <u>Risks</u> <u>Quantified?</u>	<u>Are</u> <u>Mortality</u> <u>Data</u> <u>Used?</u>	<u>Are</u> <u>Morbidity</u> <u>Data</u> <u>Used?</u>
<u>ADULTS (Ages 20-65)</u>									
Centers for Disease Control CDC HEALTH RISK APPRAISAL	Basic	34	2	No	Yes	Yes	Yes	Yes	No
Control Data Corporation HEALTH RISK PROFILE	Expanded	84	16	Yes	No	Yes	Yes	Yes	Yes
General Health PERSONAL RISK PROFILE	Expanded	110	2	Yes	Yes	Yes	Yes	Yes	Yes
Health and Welfare Canada EVALU-LIFE	Basic	25	3	No	Yes	Yes	Yes	Yes	No
Institute for Lifestyle Improvement LIFESTYLE ASSESSMENT QUESTIONNAIRE	Expanded	256	1	No	No	Yes	Yes	Yes	Yes
International Health Awareness Center PULSE	Expanded	143	20	Yes	No	Yes	Yes	Yes	Yes
Medical Data Nation HEALTH 30'S QUESTIONNAIRE	Expanded	81	8	No	No	Yes	Yes	Yes	Yes
Prospective Medicine Center HEALTH HAZARD APPRAISAL	Basic	105	4	No	Yes	Yes	Yes	Yes	Yes
Regional Health Resource Center RHRC HEALTH HAZARD APPRAISAL	Expanded	57	6	No	No	Yes	Yes	Yes	Yes
Rhode Island Department of Health WELLNESS CHECK	Point	47	2	No	No	No	No	No	Yes
St. Louis County Health Department HEALTH RISK APPRAISAL QUESTIONNAIRE	Basic	39	2	No	No	Yes	Yes	Yes	Yes
Straub Clinic HEALTH POTENTIAL APPRAISAL	Expanded	16	5	No	No	Yes	No	Yes	Yes
University of California - San Francisco HEALTH HAZARD APPRAISAL QUESTION- NAIRE	Basic	7	1	No	No	Yes	Yes	Yes	Yes
Well Aware About Health YOUR HEALTH RISK PROFILE	Expanded	99	16	Yes	Yes	Yes	Yes	Yes	Yes
Wellsource, Inc. LIFE	Point	194	9	No	Yes	Yes	Yes	Yes	Yes

Exhibit B-4 (Continued)

SUMMARY OF CHARACTERISTICS OF COMPUTER-SCORED HRA'S

Target Group Provider HRA INSTRUMENT	Type	Number of Questions	Page Length	Is Color Used?	Are Graphs Used?	Printout Characteristics			
						Risk/ Achievable Ages Given?	Are Risks Quantified?	Are Mortality Data Used?	Are Morbidity Data Used?
<u>ADULTS (Ages 20-65) (Continued)</u>									
Wisconsin Center for Health Risk Research HEALTH RISK ASSESSMENT QUESTIONNAIRE	Basic	220	8	No	No	Yes	Yes	Yes	Yes
<u>TEENS/YOUNG ADULTS (Ages 12-20)</u>									
Centers for Disease Control TEEN HEALTH RISK APPRAISAL	Teen	63	1	No	Yes	No	Yes	Yes	Yes
Rhode Island Department of Health TEEN WELLNESS CHECK	Teen	46	2	No	No	No	No	Yes	Yes

NOTE: The following four providers have developed adult HRA's for "in-house" use by their organization, not for general distribution.

Boston University Medical Center SELF-ADMINISTERED HEALTH AND RISK ASSES- MENT QUESTIONNAIRE	In-house	14				"NO PRINTOUT AVAILABLE"			
Deaconess Hospital HEALTH PRACTICES SURVEY	In-house	96				"NO PRINTOUT AVAILABLE"			
Duke University NEW PATIENT WORKUP FORM	In-house	6				"NO PRINTOUT AVAILABLE"			
Kimberly-Clark Corporation LIFESTYLE PROFILE QUESTIONNAIRE	In-house	5				"NO PRINTOUT AVAILABLE"			

Basic HRA's Using Mortality Risk Calculations

There are several HRA's within this category that are very similar. They are directly derived from the original Robbins and Hall Health Hazard Appraisal (1970) which estimates risk to cause of death relationships using numeric calculations. The questions on each questionnaire are virtually identical. The results printout displays causes of death (i.e., mortality) numerically in deaths per 100,000 and/or in bar graph form. Risk and achievable ages are calculated and represent a summary of overall risk. Recommendations are made to improve health risks as they relate to specific causes of death, sometimes with a numerical value given indicating the years of life to be gained by improving that risk. Risk of illness or accident (morbidity) is not given. The HRA's in this group include:

<u>Provider</u>	<u>HRA Instrument Name</u>
Centers for Disease Control	CDC/HRA
Health and Welfare Canada	EVAL-U-LIFE
Prospective Medicine Center	Health Hazard Appraisal
St. Louis County Health Department	Health Risk Appraisal Questionnaire
University of California - San Francisco	Health Hazard Appraisal Questionnaire
Wisconsin Center for Health Risk Assessment	Health Risk Assessment Questionnaire

Expanded Versions of Mortality-Based HRA's

Several providers/developers of HRA's utilize the basic mortality risk tables in which risks are numerically weighted for causes of death, and the risk and achievable age calculations are included as a component of the HRA. However, some have adapted and expanded selected questions to provide for broader coverage of specific risk topics and some have modified the results printout to express level of risk and risk relationships in unique ways.

Control Data's Health Risk Profile

This appraisal uses only the basic HRA components (described above) but presents the results in a small colorful, personalized results booklet (16 pages in length) with color photographs of healthy activities and general information about specific risks. The questionnaire includes additional questions on physical measurements, laboratory tests, and stress characteristics, however, not all of this information is summarized on the printout.

General Health's Personal Risk Profile

The questionnaire contains questions on stress and depression symptoms. The one-color results printout emphasizes the three major causes of death categories of cardiovascular disease, motor vehicle accidents, cancer, and the risks associated with each. Stress characteristics, in "Type A" behavior terms, are listed as a quantified risk for cardiovascular disease.

Institute for Lifestyle Improvement, Stevens Point, Lifestyle Assessment Questionnaire

The questionnaire is very extensive, approximately 286 questions, and expands the mortality-related questions to morbidity-related categories on personal habits, feelings and emotions, environment and community, auto safety, rest and relaxation, fitness, topics for personal growth, and medical history. The one-page results printout gives a point score for each major health category in the questionnaire, presents the mortality data with quantified risks and risk ages, summarizes current medical problems, and makes recommendations for follow-up health education programs and materials. This HRA was originally developed for use with college age students.

International Health Awareness Centers PULSE

The questionnaire includes questions on exercise, nutrition, stress, dental health, and health knowledge. The 20-page results printout uses a band of red-yellow-green with a computer printed bar graph at the top of each page to depict level of risk for causes of death and specific risks. Quantified mortality data are

augmented with morbidity risk information. The last page is a Self-Health Contract to help individuals begin health improvement planning.

Medical Datamation's Health '80 Questionnaire

The questionnaire includes extensive medical history, nutrition, exercise, stress, and hazardous practices and environment sections. Two results printouts are produced for each individual from the questionnaire: a Health Risk Analysis and a Lifestyle Index Report. The Analysis is similar to the mortality-based HRA's described in the preceding section. The Lifestyle Index emphasizes risk results and recommendations related to dietary, exercise, stress, and smoking. Some quasi-quantitative morbidity calculations are used along with the narrative to explain personal lifestyle risks.

Regional Health Resource Center's Health Hazard Appraisal

The questionnaire includes more detailed questions on medical history and screening tests, stress and depression, and motor vehicle safety. The printout, in addition to presenting the basic quantitative HRA mortality information, uses morbidity data to calculate a stress score, gives recommendations to improve general well-being, and makes specific recommendations for periodic screening and diagnostic tests.

Straub Clinic's Health Potential Appraisal

This questionnaire has expanded sections on nutrition, exercise, stress, and biometric measures and laboratory tests. The one-page printout presents only risk and achievable ages as a summary of the mortality risk calculations. Other sections present quasi-quantitative morbidity risk information in green, yellow, and red bars corresponding to risk level for nutrition, exercise, consumption of tobacco/alcohol/drugs, and stress.

Well Aware About Health's Health Risk Profile

The questionnaire includes detailed sections on medical history; physical and laboratory measurements, and fitness tests; stress, life contentment, and social

relationships; eating habits; and living habits which includes detailed questions of motor vehicle safety practices. The colorful, 16-page results printout includes the basic HRA mortality causes of death, risk age, and risk information but emphasizes immediate improvement of health practices to optimize life quality. Morbidity data are used to give quasi-quantitative risk levels in red, yellow, and green columns denoting high, cautionary, or low levels of risk for "Things You Can Control" and "Things You Can't Control." All physical, laboratory, and fitness data are presented and risk-ranked. Recommendations are made for periodic health maintenance examinations and health conditions that need immediate medical attention are displayed. At the outset, individuals are congratulated for their positive health practices.

Point-Scored HRA's

These HRA's differ from the mortality-based HRA's in the way they present risk information as a score compared to a certain optimum.

Rhode Island Department of Health Wellness Check

The questionnaire contains questions on lifestyle habits with expanded emphasis on diet, exercise, and auto safety; moods and stress; occupational health exposures; and preventive care practices. The questionnaire responses are computer-analyzed to produce a one-page printout that gives an overall HRA point score (100 being optimum). Specific risks are not quantitatively presented or scored. Narrative recommendations are given to improve risks. For follow-up educational information, referral is made to specific pages of the "Way to Wellness" booklet that accompanies the results printout.

Wellsorce's LIFE Inventory

The questionnaire has 194 questions including eating habits/food intake, exercise, safety, and stress, along with detailed medical history and current symptoms and physical measurement sections. Attitudes about health issues are also questioned. The nine-page LIFE printout presents basic HRA mortality information using causes of death bar graphs and risk ages to summarize risk

quantitatively. Point scores based on morbidity data are given and a bar chart is used to show value of the score from poor to excellent. Likewise, bar charts and point scores are used to present heart health, fitness, stress, nutrition, and attitudes with detailed breakdowns of the risks associated with each. Narrative recommendations are given to reduce risks for specific causes of death.

Teens/Young Adult HRA Versions

Centers for Disease Controls (CDC) Teen Health Risk Appraisal

This HRA is currently being field tested and at the time of report preparation, is not generally available. The questionnaire is similar to the CDC adult version and contains questions to determine risk for major causes of death for the teenage group. However, additional questions have been included on eating habits, exercise, safety belt use, life contentment and stress, social factors, home environment, self-confidence, and future educational and work goals. The one-page results printout does not summarize risk with a risk age but rather gives a lifestyle point score. Major causes of death are ranked giving deaths per 1,000 and graphically compared in a bar chart. A high-average-low risk ranking is given for each cause of death. Positive lifestyle habits are listed as well as negative ones. Recommendations for lifestyle changes are made.

Rhode Island Department of Health Teen Wellness Check

The questionnaire queries diet, dental health, immunizations, exercise, substance use of tobacco/alcohol/drugs, motor vehicle safety, hazardous activities, moods and stress, and sexual activity. The two-page printout gives a summary point score (100 is optimal) and overall risk rating (i.e., poor, fair, excellent, etc.). Positive feedback is given about areas in which the teen scored well. Responses to questions on drugs and sexuality are not summarized; however, everyone receives educational messages about these subjects. Risks are summarized by category, in a narrative form, although no score is expressed. For each risk factor, referral to specific pages of the "Way to Wellness for Teens" health education booklet is made for each individual who has need of improving dangerous health risks.

"In-House" HRA Instruments

The last items on Exhibit B-4 are HRA's that have been developed for internal use by a particular organization. For the most part, these are medical history forms that have been expanded to include questions on lifestyle habits, safety, and other risks. Some of these gather all the needed information to calculate the basic mortality-based HRA risk predictions. None of these organizations submitted the results printouts for review. Notable, however, is the trend for medical departments to broaden the scope of patient forms to include questions on preventable risks using the HRA concept.

MICROCOMPUTER-BASED HRA'S

Three microcomputer-based HRA's were reviewed. All are based on the original Robbins and Hall, Health Hazard Appraisal (1970), adapted and used by the Centers for Disease Control.

CDC Adult HRA - Microcomputer Version

This version is very similar to the "large computer" version and the results printout is nearly identical to the original mainframe version. It is written in BASIC language and runs on an IBM-PC or compatible microcomputer, with at least 128K of memory. It requires at least one built-in, double-sided floppy disk drive. To produce the printout, a printer that can handle a 132-character/line format is required. It operates in a batch processing mode. A group summary program written in BASIC is also available which produces a one-page overview of group risk characteristics.

The program is currently only available to health care delivery and health sciences education organizations.

Minnesota Educational Computing Corporation's (MECC) - Health Maintenance Amendment, Vol. II

This HRA is for teens, young adults, and adults. It is developed for use on the Apple II computer. The diskette contains a printer option to interface with a standard printer. The first program on the diskette is a shortened version of an

HRA which collects information on an individual's current lifestyle and computes mortality risks and risk ages. It uses an awareness-building format.

University of Minnesota's Health Risk Appraisal (UM-HRA)

This HRA is a conversational (interactive) computer program for health care professionals to use with adult patients/clients. It computes mortality risks and risk ages. It can be used with Apple II, II+, IIe, or other compatible computers with 48K of memory.

SELF-SCORED HRA'S

Self-scored HRA's are not regarded as health risk appraisals in the truest sense but rather self-check-up quizzes. These are primarily used as personal health awareness tools or games. Most of the self-scored tests include one or more questions from the health-related categories of: nutrition/eating habits; exercise/fitness; use of substances like tobacco/alcohol/drugs; safety; stress/life contentment; social interaction; and sometimes, spirituality.

Self-scored HRA's are usually paper and pencil forms where single items or categories are given a point score, color, or symbol. The "scores" are either summed and interpreted by each category or by the accumulated sum of all categories. Numeric points, colors, or symbols are counted, summed, and a relative "score" or rating is determined.

Instruments that use a cumulative score (a tally of the scores for each health-related category) give an overall health rating which determines if one is at high, moderate, or low health risk. HRA's that follow this scoring pattern include:

<u>Provider</u>	<u>HRA Instrument Name</u>
Center for Consumer Health Education Health and Welfare Canada	Lifescore for your Health Your Lifestyle Profile
Kansas Department of Health and Environment	PLUS Instrument (which includes the Canadian Lifestyle Profile)
Northwestern Mutual Life	The Longevity Game
Pima County Health Department	Adult Awareness Program
Rodale Press, Inc.	Your Personal Prevention Report Card
Wellness Associates	Wellness Inventory and Wellness Index

Frequently, the overall health rating or score is translated into an estimate of personal life expectancy in years or expected age at death. Those that summarize the score in this manner include:

<u>Provider</u>	<u>HRA Instrument Name</u>
Center for Consumer Health Education	Lifescore for your Health
Northwestern Mutual Life	The Longevity Game

Other self-scoring instruments emphasize the categorical rating or scores and give no overall score. These include:

<u>Provider</u>	<u>HRA Instrument Name</u>
USDHHS	Healthstyle - a self-test
Wyoming Division of Health and Medical Services	Healthstyle - a self-test for seniors
Texas Department of Health	My Personal Health Profile
University of Rhode Island Health Services	Health Graph
Wellness Associates	Wellness Inventory and Index

Regardless of the scoring system, the "scores" are usually interpreted narratively and give a relative indication of risk. Some do not elaborate about the risk level but by implication rely on the questions asked and the negative scores to urge respondents to evaluate improvements they could make or consequences of continued hazardous practices. Suggestions are often made of where to seek additional risk-reducing information. Many self-scored instruments are cleverly designed, attractively formatted, and simple to complete. They are inexpensive, usually quick to administer, and well-suited for the following situations:

- o Stimulating awareness that personal attributes, attitudes, habits, and behaviors directly affect health and longevity.
- o Introducing the concept of health risk appraisal to an individual, group, or audience--to prepare or motivate them to participate in a more detailed appraisal of their health.
- o Educating individuals about the multifactorial nature of disease, accidents, and death. (For example, heart disease has no single cause, but rather is a combination of two or more factors such as smoking, high blood pressure, a diet with excess fat and salt, etc.)
- o Providing an easy, accessible form for an individual to periodically self-evaluate his/her health.

SUMMARY OF HRA INSTRUMENT SURVEY

Although self-reported use is usually overestimated by the respondent, infrequent or nonuse of safety belts is the most prevalent modifiable health risk when HRA group data are summarized. All safety belt information gathered and analyzed by a health risk appraisal is self-reported. No reference in the literature was identified with a formal or informal study done with observed use/non-use. None of the providers contacted in this survey indicated any additional findings in this regard.

Generally, HRA programs do not follow-up the appraisal with specific programs, literature, or emphasis on using safety belts to reduce motor vehicle accident risk. Perhaps this is due to the fact of the immediate seriousness of other risks; such as, elevated blood pressure, overweight, smoking, overuse of alcohol, etc. Or perhaps, until very recently, motor vehicle accident risks were regarded as "safety" issues, outside the realm of the health/medical professionals that usually coordinate HRA programs.

Responses to the solicitation for information for this study indicate that, among HRA program coordinators, there is support, willingness, and interest in "doing more" specific safety belt use education following administration of the HRA. There was an expressed need for materials and methods to complement the HRA's personalized results. Time, however, is a factor when results are presented either in one-to-one counseling or in a group session because safety belt use is only one of many risk that must be emphasized.

APPENDIX C

**SUMMARY OF AVAILABLE SAFETY BELT FILMS,
PAMPHLETS, POSTERS, AND CURRICULUM PACKAGES**

FILMS AND AUDIOVISUAL

Title	Media	Time	Description	Availability
Dynamics of a Crash	16 mm sound film	2½ minutes	Shows what happens to vehicle and unbelted occupant in a head-on collision.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, SW Washington, DC 20590
Safety Belts Save Lives	16 mm sound film	2 minutes	Emphasizes the necessity of wearing both lap and shoulder belts.	Chrysler Corporation Highland Park, MI 48203
Risk	16 mm color/sound film	1½ minutes	Reveals the substantial risk of being injured in a car crash over a lifetime of driving or riding.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, SW Washington, DC 20590
Rediscover the Safety Belt	16 mm sound film	8½ minutes	Narrated by former astronaut Wally Schirra. Excellent general information covering important facts and myths with personal interviews.	NHTSA Occupant Protection Materials NTS-14 400 7th Street, SW Washington, DC 20590
Safety Belts and You	16 mm sound film	8½ minutes	Demonstrates the effectiveness of safety belts in various types of crashes (roll-over, frontal, rear-end), showing the human collision in every instance.	Available on loan from NHTSA or purchase from: Ford Motor Company Dearborn, MI 48121 (313) 322-9172
Are You Convinced?	16 mm sound film	5 minutes	Emphasizes the effectiveness of wearing safety belts and dispels commonly held myths that are given as reasons for not using safety belts.	Available on loan from NHTSA or purchase from: Film Loops P.O. Box 2233 Princeton, NJ 08540 (609) 921-2020
Dice in a Box	16 mm color/sound film	22 minutes	Discusses operation and use of belts, Canadian child restraints, and why pregnant women should wear belts. Suggested for adult audiences.	Order from Film House Toronto, Ontario, Canada for \$95.
Room to Live	16 mm sound film	30 minutes	Good film for more than one session or when only a film is used.	The Media Group, Ltd. 2215 29th Street Grand Rapids, MI 49508
Child Restraints	16 mm film	3 minutes	Shows what happens to children in a crash, how child seats and seat belts help, and how to use child restraints properly.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, SW Washington, DC 20590
Children and Infants In Car Crashes	16 mm film	5 minutes	Silent film that demonstrates what happens to children when they are restrained and when they are not.	Insurance Institute for Highway Safety 600 New Hampshire Avenue, NW Suite 300 Washington, DC (202) 333-0770
Childsafe	Slides and cassette tape	—	Explains to parents the necessity of using crash protection for their children.	Available on loan from: NHTSA or contact: National Safety Council 444 North Michigan Avenue Chicago, IL 60611 (312) 527-4800
Lucky 13	Film or videotape	15 minutes	Designed for junior high school and young adult audience. An entertaining, humorous, and informative story about a test dummy who has mistakenly been scheduled for a crash test without safety belts. The dummy "comes to life" during the episode to avoid the unbelted crash and to make a point about the benefits of safety belts.	Available for loan from NHTSA.
The Price You Pay	16 mm film	18 minutes	A film that takes the viewer a step beyond the collision of an automobile carrying an unbelted passenger. Addresses the long-term consequences (both emotional and monetary) of a young male adult who is seriously injured in the car crash. Good motivational and emotional appeal, recommended for use in conjunction with supplementary information or crash dynamics.	Available for loan from NHTSA.
Room to Live II	Film or videotape	28 minutes	A "chalk board" presentation by former state police trooper, that is a follow-up to Room to Live. Emphasizes that safety belts are the most effective protection against injury or death in automobile crashes.	Available from the Media Group, Ltd., for purchase (\$575 all formats); or rental (\$80 for three days; \$115 for five days). Rental price can be applied to purchase if within 30 days.

FILMS AND AUDIOVISUAL (CONTINUED)

Title	Media	Time	Description	Availability
Safety Belts: Fact and Fiction	Slide/cassette show	10 minutes	Designed to increase knowledge about the lifesaving benefits of safety belts. Addresses common myths and fears about safety belt usage. Uses graphic illustrations (no actual or dramatized depictions). Recommended for use following film which addresses dynamics of a car crash.	Available for loan from NHTSA.
Safety Belts: How Effective Are They?	Filmstrip/audio cassette	18 minutes	Presentation providing factual portrayal of several case studies showing crash details, vehicle destruction, and personal injuries. Clearly demonstrates effectiveness of safety belt use.	Available for purchase (\$25) or loan (no charge) from the Michigan Driver and Traffic Safety Education Association.
Stayin' Alive	Slide/cassette	25 minutes	About the consequences of drinking and driving. True story narrated in part by an adolescent male who was permanently disabled in a crash after drinking and driving. Program was developed specifically for use in high schools as part of driver safety program. Using safety belts and avoiding alcohol when driving are emphasized. Printed material to reinforce program content is available. Presentation currently is being updated in cooperation with the University of Wisconsin.	Contact the Wisconsin Department of Transportation for availability.
A Little Restraint	16 mm film	15 minutes	Presents case histories and testimonials from people who were saved from death or serious injury by using safety belts. Documents evidence of safety belt effectiveness and demonstrates how safety belts are tested.	Available from the American Seat Belt Council for purchase (\$225); or rental (3 days, \$15, or 15 days, \$50).
A Matter of Time	Audiovisual package that uses 9 slide projectors and a double screen with stereo sound	15 minutes	The presentation opens with a scene of what happens when a car crashes at 55 mph, and is followed by the case histories of two young adults who are permanently bound to wheelchairs as the result of a car crash. Includes an instructional support package, a survey on safety belt use, agendas for parent and faculty meetings, and suggested activities for 13 subject areas such as language arts and health education.	Available within the state of Washington Traffic Safety Commission.
Broken Glass	16 mm film	22 minutes	Canadian film focusing on what happens when humans in an automobile—the "dice in a box"—are involved in a car crash. Dr. Smith, a coroner, discusses the value of safety belts with a high school reporter.	Available from Film House for purchase (\$116.35); loans available from Modern Talking Picture Service.
Do You Buckle Up?	16 mm film	8 minutes	Film that presents arguments to support using safety belts. Discusses commonly held myths and excuses given for not using safety belts. Demonstration of the "convincer." Targeted for 4th to 9th grade students. Narrated by a 13-year-old boy.	Available from Film Loops, FLI Learning Systems, Inc., for purchase (\$105); rental not available.
Egg, Pumpkin, Headache	16 mm film	1½ minutes of public service announcements	Designed to catch viewer's attention and make a point quickly. "Egg" conveys the idea that safety belts prevent you from colliding with the inside of your car in a crash. "Pumpkin" demonstrates, abstractly, what happens when one is ejected from a motor vehicle during an accident. "Headache" emphasizes effectiveness of using lap and shoulder belts to avoid head contact with dashboard and windshield.	Available for loan from NHTSA.
Get It On	Slide/cassette program	10 minutes	Designed to convince an audience to use safety belts. Effectively uses crash and injury statistics, case studies, crash tests, and pictures of vehicles involved in crashes to emphasize major points. Presents effectiveness data from Sweden where safety belt use is mandatory. Pamphlets which reinforce the program's message are available from the Motor Vehicle Manufacturers Association. Up to 99 pamphlets can be obtained free of charge. For 100 or more, there is a charge of \$.10 each.	Film available for loan from the Motor Vehicle Manufacturers Association and NHTSA.
It'll Never Happen to Me	16 mm film and videotape (3/4" or 1/2")	21 minutes	Narrated by an accident victim who presents factual information about safety belt use and the consequences or not wearing them. Common myths and excuses for not wearing safety belts are described, as are the personal consequences experienced by a male in his early 30s who was involved in a car crash in which he was unbelted.	Film and videotape discussion guide available from Visucom Productions, Inc., for purchase (\$550 for all formats); or rental (\$90 for 3 days; \$110 for 5 days).
Corporate Safety Belt Program	Slide-tape	—	Program aimed at upper-level management. Presents the corporate safety director's approach to selling and implementing a corporate safety belt policy.	F.L.I. Learning Systems, Inc. P.O. Box 2233 Princeton, NJ 08540 (609) 466-9000

FILMS AND AUDIOVISUAL (CONTINUED)

Title	Media	Time	Description	Availability
The Human Collision	Film	30 minutes	Explains the function of safety belts and refutes some of the popular arguments against their use such as: "It's better to be thrown clear of the vehicle." "Belts make it harder to escape from a burning or submerged vehicle." Includes a description by an otolaryngologist of the biomechanics of injury for the driver and passenger.	Transport Canada 1201 Wilson Avenue Downsview, Ontario Canada (416) 248-3210 Loan (2-week preview) Film House 22 Front Street Ontario, Canada M5J 1C4 (416) 364-4321 Purchase: \$127.58
Unrestrained Flying Objects	Film	15 minutes	Safety belts, how to wear them, and the excuses people give for not wearing them. Includes details on the use of anthropomorphic dummies, their construction, and testing. Shows the safety features in the car interior such as the padded dashboard and the energy-absorbing steering column.	GM Research Labs GM Tech Center 12 Mile and Mound Road Warren, MI 48090
The Automatic Answer (2 versions)	16 mm film Videotape	6 minutes 11 minutes	How passive restraints (primarily airbags) can prevent injuries. Includes testimony of crash both versions survivors.	Modern Talking Picture Service 3000 Park Street North St. Petersburg, FL 33709 (813) 541-5763 Insurance Institute for Highway Safety Communications Department Watergate 600 600 New Hampshire Avenue, N.W. Washington, DC 20037 (202) 333-0770
Crashes That Need Not Kill	16 mm film or videotape	28 minutes	How airbags could save thousands of lives and prevent tens of thousands of injuries. The film includes testimony of several crash victims who were "saved" by their airbags.	Modern Talking Picture Service 3000 Park Street North St. Petersburg, FL 33709 Insurance Institute for Highway Safety Communications Department Watergate 600 600 New Hampshire Avenue, N.W. Washington, DC 20037 (202) 333-0770
Passive Restraints, Ready When You Are	Film	20 minutes	Focuses on airbags including their technology. Discusses some of the myths which have prevented the implementation of federal safety standards which would have required them.	University of Michigan Transportation Research Institute Public Information Materials Center 2901 Baxter Road Ann Arbor, MI 48109
Reliable Airbag	Film	20 minutes	Produced by Allstate (promotional). Includes an interview segment with Ralph Nader. Shows the airbag sensor system.	University of Michigan Transportation Research Institute Public Information Materials Center 2901 Baxter Road Ann Arbor, MI 48109
America's Greatest Tragedy	—	—	—	NHTSA U.S. Department of Transportation 400 Seventh Street, S.W. Washington, DC 20590
But If You Live...	16 mm film or videotape (Beta- max, 3/4", VHS)	15 minutes	Drunk driving accident survivors and their subsequent rehabilitation.	Kemper Group Kemper Television Center, F6 Long Grove, IL 60049 (312) 540-2000
The Decision	16 mm film	11 minutes	—	National Safety Council 444 N. Michigan Avenue Chicago, IL 60611 (312) 527-4800
Social Drinking - Fun and Fatal	16 mm film	11 minutes	—	National Safety Council 444 N. Michigan Avenue Chicago, IL 60611 (312) 527-4800
Until I Get Caught	Film or videotape	27 minutes	Footage from original TV documentary.	Southerby Productions 300 E. Anaheim P.O. Box 15403 Long Beach, CA 90815 (213) 498-6088 NHTSA U.S. Department of Transportation 400 Seventh Street, S.W. Washington, DC 20590 Free loan

FILMS AND AUDIOVISUAL (CONTINUED)

Title	Media	Time	Description	Availability
Don't Risk Your Child's Life: How To Protect Young Automobile Passengers	16 mm, Super 8, or videotape	14 minutes	Crash test footage. Shows the correct use of child restraints and seat belts for older children. Explains top tether straps.	Physicians for Automotive Safety P.O. Box 430 Armonk, NY 10504 (914) 273-6446
Life Is Precious, Buckle Them In	Film	14 minutes	A pediatrician explains the "human collision" with emphasis on pregnant women, newborns, and young children. Shows different types of child restraint devices and how to use them. Includes footage on the danger of holding an infant on the mother's lap. Target: pre-natal classes. Of interest to others as well.	Transport Canada 1201 Wilson Avenue Donswview, Ontario Canada (416) 248-3210 For loan
Belted and Unbelted Crash Tests	Videotape	4 minutes	Barrier crash tests at 30 mph for various GM cars from 1929-1982. Also shows unbelted and belted sled tests.	GM Research Labs GM Tech Center 12 Mile and Mound Road Warren, MI 48090
Vehicle Crash Rescue for Physicians	Film	20 minutes	A fairly good current film on extrication. Of interest to others besides physicians.	—
The Big Test	Videotape	15 minutes	History and promotion of GM proving grounds. Shows phases of development and types of testing. Also, discusses interaction between the driver, the roadway and the vehicle.	GM Research Labs GM Tech Center 12 Mile and Mound Road Warren, MI 48090
Booby Trap	16 mm film or 3/4" videotape	28 minutes	Common roadside hazards such as rigid light poles, blunt-end guardrails and bridge abutments, and options for accident prevention. Including Ben Kelley, Susan Baker, Bill Haddon, and Andrew Riko (counsel for IIHS).	Modern Talking Picture Service 5000 Park Street North St. Petersburg, FL 33709 (813) 541-5763 Insurance Institute for Highway Safety Communications Department Watergate 600 600 New Hampshire Avenue, N.W. Washington, DC 20037 (202) 333-0770
Motorcycle Safety-Helmet Effectiveness	Film	22 minutes	—	USDOT sponsored research on helmet effectiveness.
Report On Bumpers	16 mm film and videotape	14 minutes	Uses crash test footage to demonstrate the differences in effectiveness between older bumpers, the 5 mph bumpers which were required (1973-1982), and the newer, less effective bumpers.	Modern Talking Picture Service 5000 Park Street North St. Petersburg, FL 33709 (813) 541-5763 For loan Insurance Institute for Highway Safety Communications Department Watergate 600 600 New Hampshire Avenue, N.W. Washington, DC 20037 (202) 333-0770 For purchase

PAMPHLETS AND POSTERS

Title	Description	Contact
Myths & Facts About Child Child Car Safety	A double-fold pamphlet which addresses six common myths with convincing counter-arguments. Also tells where child safety seats can be purchased.	NHTSA Occupant Protection Materials NTS-14 400 7th Street, S.W. Washington, D.C. 20590
A Family Shopping Guide to Infant/Child Automobile Restraints and Types of Safety Seats	8½" x 11" information sheet. Side one gives general guidelines for choosing a car seat and lists approved seats on the market as of July 1982. Side two includes graphics and descriptions of various types of safety seats. 1982.	Division of Public Education American Academy of Pediatrics 1800 Hinman Avenue Evanston, IL 60204
Safer Than A Mothers's Arms	This 17" x 20" glossy poster shows a young woman securing her child in a safety seat located in the back of her car. Large red letters over the photo state: "Safer than a mother's arms"; black lettering beneath says, "a safety seat...the only secure place for a child in a car."	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
Myths & Facts About Child Car Safety	This colorful illustrated 18" x 24" glossy poster gives three common myths and facts which counter them.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
How Many of These Fairy Tales Have You Told?	Six common myths about wearing safety belts are presented in this 8-page pamphlet featuring Peter Pan, Pinocchio and other fairy tale characters. Convincing arguments counter each myth. 1977.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
Safety Belts - A History Lesson for Adults	A brief lesson on crash dynamics including an explanation of the second (human) collision and reasons for wearing safety belts. "Car-sensitive" belt systems are also described in this 8-page fold-out pamphlet. 1982.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C.

PAMPHLETS AND POSTERS (Continued)

Title	Description	Contact
The Automobile Safety Belt Fact Book	A 24-page booklet containing persuasive facts about the protection safety belts provide. Included are: detailed descriptions of the second collision and its prevention; special protection for small children and how to influence others to use safety belts. 1982.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
Safety Belt Fact Sheet	8½" x 11" information sheet. Side one cites statistics of car accident fatalities and how safety belts can make a difference; a graphic description of the "human collision"; common myths and facts countering them; and information on the effectiveness of safety belts. Side two shows how a safety belt works and describes types of child safety seats. (Sample provided in Kit.)	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
The Human Collision	This 20-page booklet contains illustrations and photographs of real-life accidents and laboratory simulation showing the outcome of car accidents in which occupants either used or did not use safety belts. Included are: what happens in a collision; how safety belts prevent the human collision; child safety seats; why safety belts should be worn, and a 2-page bibliography. 1976.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
I Want You To Buckle Up	Uncle Sam poster patterned after the WWI recruiting poster Uncle Sam Says, "I want you to buckle up."	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590
Get It Together	Striking graphic of a bright yellow safety belt against a black background. White lettering says "Get it Together!" (Approximately 3½" x 12"). Reproduced as a bumper sticker or poster.	NHTSA Office of Occupant Protection NTS-10 400 7th Street, S.W. Washington, D.C. 20590

CURRICULUM PACKAGES

Author/Sponsor	Packages	Description	Availability
American Automobile Association	Traffic Safety Teacher's Guide for Junior High	A teaching guide with objectives, activities, and references in four areas: alcohol, bicycle and pedestrian traffic, automobile insurance, and safety restraints.	Contact the American Automobile Association for availability.
Boy Scouts of America	Scouts--Get It Together Resource Materials	A collection of resource materials for a safety belt campaign developed in cooperation with the U.S. Department of Transportation. Contents include safety belt information, activities, and resources.	Contact Boy Scouts of America or NHTSA for availability.
Center for Health Promotion Research and Development, The University of Texas Health Science Center at Houston (forthcoming)	Development and Assessment of a School-Based Program to Increase the Use of Safety Belts by Adolescents	Center staff are currently designing, under contract with NHTSA, three 45-minute components of a curriculum that can be implemented within school-based health education and driver education courses. Curriculum activities are based on findings from relevant research; application of health behavior models, and information gathered from interviews focused on student, school personnel, and parent groups, and others. The capacity of the package to increase observed safety belt use will be assessed in the 1984-85 school year. It will be made available for distribution in 1985.	Contact the Center for Health Promotion Research and Development for availability.
Future Farmers of America	Development and Field Test of a Safety Restraint and Alcohol Education Program for Future Farmers of America (forthcoming)	Currently developing, under contract with NHTSA, safety belt education materials; including a program that students can implement in their school or community, and a guide to help principals develop safety belt education programs in secondary schools.	Contact the Future Farmers or NHTSA for availability (estimated to be Fall 1984).
FLI Learning Systems	Are You Convinced?	A kit designed for teaching importance of safety belts to high school and adult audiences. The kit includes the film Are You Convinced?, a teachers guide, and four posters.	Contact FLI Learning Systems for availability.
Highway Users Federation for Safety and Mobility	Buckle Up With Confidence (forthcoming)	A safety belt education program under development for automobile dealers, who may purchase the program and provide it free of charge to interested community groups.	Contact the Highway Users Federation for availability.
Highway Users Federation for Safety and Mobility	A Resource Curriculum in Driver and Traffic Safety Education--Contemporary Driving Supplement	Geared for driver education teachers in particular, this resource is a supplement to A Resource Curriculum in Driver and Traffic Safety Education, published in 1975. The supplement contains concepts and student objectives in three areas: energy conservation, occupant restraint, and the changing vehicle mix.	Contact the Highway Users Federation, the American Automobile Association, or the American Driver and Traffic Safety Education Association for availability.
Lockett, D.W., and Wyron, R.C.	Guidelines for a K-12 Traffic Safety Education Curriculum, Volume II--Curriculum Content and Instructional Approach	National Highway Traffic Safety Administration, #DOT-HS-806-449, June 1983. Contains recommended content and instructional approach guidelines for a K-12 traffic safety curriculum (including occupant safety, alcohol safety pedestrian safety, and bicycle safety).	Contact NHTSA for availability.
McPherson, K., McKnight, A.J., Weidman, J.R.	Supplemental Driver Safety Program Development Final Report: Volume II Pilot and Field Test Module Materials	National Highway Traffic Safety Administration, #DOT-HS-806-472, February 1983. Contains curriculum plans for 16 to 18-year-old drivers and is intended for use by high school teachers and other service providers. Four subject areas are addressed: restraint usage, speed management, alcohol, and hazard perception (i.e., pedestrian, and bicycle). Program materials are designed to supplement driver education programs but can also be applied in other contexts. The section on restraint usage contains an instructor's guide and student manuals for the five following modules. (1) The Information Module includes: the student manual, "Safety Belts, What Do You Think?;" and, the film, "Dice-in-a-Box." (2) The Peer Testimonial Module includes the Wisconsin "Stayin' Alive" program. (3) The Information and Peer Testimonial Module includes: the student manual. "Safety Belts, What Do You Think?;" the Wisconsin "Stayin' Alive" program; and the film, "Dice in a Box." (4) Information and Convincer Ride Module includes: the student manual, "Safety Belts, What Do You Think?;" the film, "Dice-in-a-Box;" and the "convincer" ride. (5) Crash Dynamics Module (which is an adaptation of "A Suggested Safety Belt Instructional Plan for High School Teachers") includes six short film strips; "The Egg," "Safety Belts Save Lives," "Safety Belts and You," "Pumpkin," "Child Restraints," and "Headache."	Contact NHTSA for availability.

CURRICULUM PACKAGES

Author/Sponsor	Packages	Description	Availability
National Highway Traffic Safety Administration	Safety Belt Use Package: Educational Program Materials	NHTSA is currently working with four cooperating associations to develop safety belt education packages. Materials are being developed specifically for pre-school groups (with the National Association for the Education of Young Children); kindergarten through third-grade children (with the National PTA); driver education students (with the American Driver and Traffic Safety Education Association) and health education classes (with the Association for the Advancement of Health Education). Each educational packet will contain a category specific teacher's guide, reproducible activity worksheets, background papers, and a wall poster.	Packets will be available in time for the 1984-85 school year from NHTSA or from respective cooperating associations.
National Highway Traffic Safety Administration	Seat Belt Science: Activities for General Science	National Highway Traffic Safety Administration, #DOT-HS-806-201, July 1982. A kit which includes a student workbook, teacher's guide to the workbook, a safety belt fact sheet, the report "The Human Collision," and the film "Dynamics of a Crash."	Contact NHTSA for availability.
Washington Traffic Safety Commission	The Real Connection: A Teacher's Guide for Safety Belt Education	Part of a safety belt education curriculum developed to increase the understanding and use of safety belts by children ages 5-15. Includes objectives and suggested learning activities.	Contact the Washington Traffic Safety Commission for availability

APPENDIX D

THE GREAT AMERICAN HABIT PLAN

My Seat Belt Record

Habit Day	Write in Day of Week	Seat Belt Use Record	Habit Day	Write in Day of Week	Seat Belt Use Record	Habit Day	Write in Day of Week	Seat Belt Use Record
1			8			15		
2			9			16		
3			10			17		
4			11			18		
5			12			19		
6			13			20		
7			14			21		

Use one of these symbols for every trip:

- = Trip without seat belt
- ⊕ = Trip with seat belt
- ⊕ = Trip with seat belt and I asked other passengers to buckle up

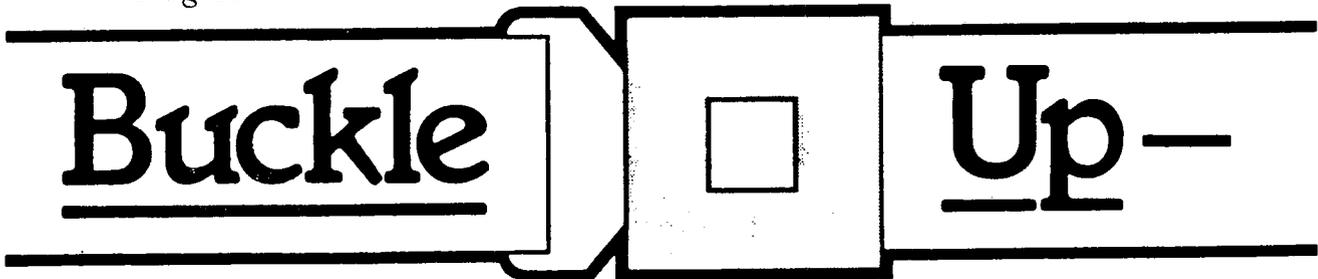
①

Example:

This shows seat belt use for six trips on the practice exercise from "Record-Keeping" section inside.

1	MONDAY	⊕⊕○○⊕⊕
---	--------	--------

I agree to . . .



It's a Healthy Habit

Signature _____

Date _____

Co-signed by a friend _____

②

Directions for attaching to visor:
 Clip to visor so your Resolution and "Buckle Up—It's a Healthy Habit" show when visor is up, and "My Seat Belt Record" shows when visor is down. Keep a pencil or pen clipped with the Plan to mark your daily entries.

*“Habit is habit, and not
to be flung out of the window. . . but coaxed
downstairs a step at a time.” - Mark Twain*

The Great American Habit Plan

Make your health risk appraisal work for you
Begin now to improve your health by reducing your risks
Learn and practice habit change methods that work
Experience self-improvement success

3

The Plan

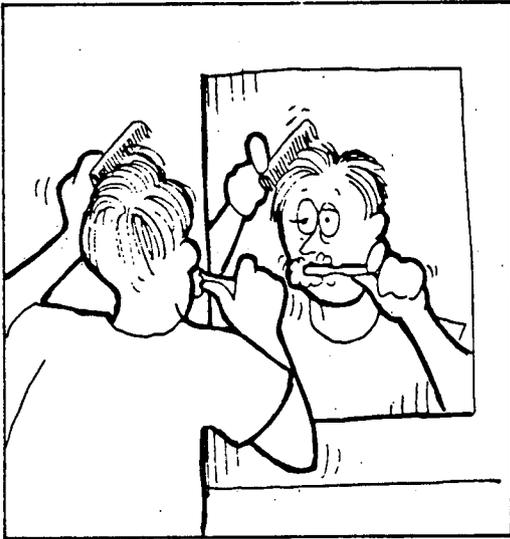
This Great American Habit Plan will help you learn to make, break, or keep a habit. Taking part in *this* process will help you develop one of the easiest, yet one of the most important, healthy habits—using seat belts while riding in a motor vehicle. This Plan is practical and can be used with other, more difficult habits you want to change. Improving your seat belt habit was selected because it's easy to do, yet often isn't done, and you can be immediately successful.



4

What is a habit?

Your habits—the patterns of your daily life—have a dramatic effect on your health. Habits are so much a part of you that they are “automatic.” Good habits make life easier because, once formed, you don’t have to think about them to have them work for you. Brushing your teeth daily, tying your shoes, or driving the same route to and from work, are examples of habits done with little or no effort.



The Great American Habit Plan has four parts—each one important when forming a new healthy habit.



6

How do you form habits?

Knowing something about habits can help you make them work *for* you, not against you. You do not inherit habits, they are *learned* through practice. A habit is a way of acting, thinking, or feeling that has become routine. Breaking old habits or making new ones takes effort, time, practice, and patience.

5

Risk Appraisal . . . tells you what your health risks are—and what you need to change for a longer, healthier life. It involves learning new things and finding out about yourself.

Resolution . . . means that you make a promise to do something to better yourself. Family and friends can give you the support you need to keep your resolution, reach your goal, and maintain your healthy habit.

Reminders . . . are things that help you remember to practice a healthy habit. Practice strengthens a new habit—the more you repeat it, the stronger it becomes.

Record-keeping . . . is a way of charting your actions and measuring your progress. Writing down your actions makes your success visible.

A healthy choice — wear seat belts!

Changing to the simple healthy habit of regular seat belt use has a profound protective effect on your personal safety. Regular seat belt use can dramatically reduce injuries or fatalities.

Keep yourself and loved ones from being a death statistic. If all Americans routinely used their seat belts, there could be 17,000 fewer deaths per year.

You may be in control of your car, but other drivers out there often aren't in control of theirs. Seat belts are your best protection against other drivers who:

- have drunk too much alcohol
- have not had enough sleep
- didn't see the light change

Seat belts give extra protection if you drive:

- a small car
- at higher speeds
- late at night
- many miles a year
- in bad weather

While you work on this habit of regular seat belt use, try not to use any of your old excuses:

"I'll never be hurt in an accident."

(It happens to someone every 10 seconds.)

"Seat belts are not comfortable."

(A crippling injury is much more uncomfortable.)

"People will think I'm a bad driver."

(Tell them you are protecting yourself from other bad drivers.)

"I never think about it."

(Let the seat belt warning system remind you, or if your's doesn't work — let the sound of closing your car door be your reminder.)

"It never pays off, accidents seldom happen."

(Everyone in the USA has a 1 in 3 chance of being in an accident that will seriously injure or kill during his or her lifetime.)

Decide that you will overcome these old ways of thinking and try something new.

7

Learning new things . . .

It is important to learn new things, update your knowledge, and learn about yourself and your own barriers to change. Here are some myths and facts about seat belts. Which myths do you believe?

Myth . . .

1. *Belts are only necessary on long trips or in bad weather.*

2. *I can always brace myself with my hands.*

3. *My car's seat belts don't seem to work.*

4. *If I wear a seat belt I might be trapped in a burning or submerged car.*

Fact . . .

1. You're more likely to be in a crash on city streets, within 25 miles from home, traveling under 40 mph and during good weather.

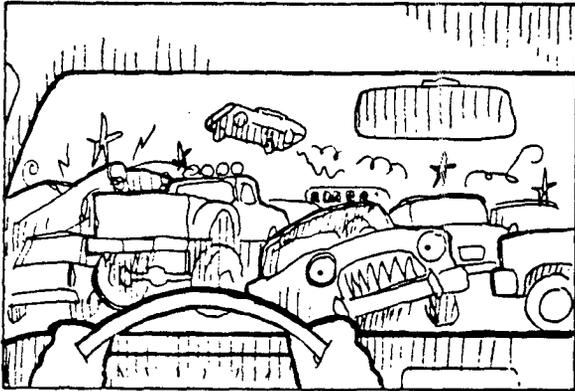
2. The force of impact at just 10 mph is like catching a 200 lb. bag of cement dropped from a first story window.

3. Seat belts are designed to be comfortable when you drive. A latching device locks the belt when your car stops suddenly.

4. Less than 1 out of every 200 injury-producing accidents involve fire or submersion. With seat belts on you are more likely to be unhurt, alert, and able to escape quickly.

R Risk Appraisal

Your unique combination of habits forms your lifestyle. Health risk appraisal is one helpful way of finding out which habits in your lifestyle need changing. For most people non-use of seat belts is the *most common* preventable risk found by the health risk appraisal.



To begin your habit change, answer the following questions to learn more about your seat belt habit.

1. What percentage of time do you now use your seat belt? (Refer to your health risk appraisal) ____%
2. What is your "Total Risk" for Motor Vehicle Accidents? _____
 (Again, refer to your health risk appraisal—If this number is higher than 1.0, your chances of dying in a motor vehicle accident are greater than average.)

Smaller Cars: Economy vs. Safety

Using a small car saves you a lot of money, but it also increases your need to buckle up. You can now calculate your risk level based on your car size and the amount of time you wear your seat belt. Notice in the chart below just how high the risk levels are if you drive or ride in a small car and don't wear a seat belt all of the time. Below, find the percentage of time you wear a seat belt and look up your risk level under your car size.

Car Size and Seat Belt Use Risk

% of Time Seat Belt Used	Large Car	Mid-size Car	Small Car
91-100%	0.3	0.5	0.7
51-90%	0.5	0.8	1.0
11-50%	0.6	1.0	1.4
0-10%	0.8	1.3	1.7

My Car Size—Seat Belt Use Risk is: _____.

What is the lowest risk level for your car size? _____.

If you now wear your seat belt *less than 100%* of the time, you can see that you can instantly improve your risk simply by buckling up.



Resolution

Have you ever made a New Year's resolution you've kept all year? Few of us have. Or, have you ever made a decision to lose weight, exercise regularly or quit smoking, only to find yourself slipping back into your old ways after just a few days? Perhaps it would help you to think of forming a healthy habit as a "new you resolution."

Don't keep your desire for a new healthy habit private — go public! Tell your family and friends about the changes you want to make and ask for their

help and support — that's what family and friends are for! At the same time your healthy habit might just rub off on them.

As part of this Plan you can let everyone know of your resolution to wear your seat belts by signing the "Buckle Up—It's a Healthy Habit" reminder and attaching it to your car's sun visor. *Sign this right now.*

Have a friend or family member who rides with you often *co-sign* this resolution — to let everyone know just how serious you are about this "contract" for a "new you."

10



Reminders

Forgetting is probably the biggest reason why people don't use seat belts. Sometimes, all you need is a reminder.

To remind you . . .

- Put this "Buckle Up—It's a Healthy Habit" sign and your "new you" Resolution on your sun visor.
- Ask your family and friends to remind you to "Buckle Up" when getting into your car or theirs.

Another way to remind yourself . . . is to remind others.

If you are the driver, emphasize your feelings of responsibility for your passengers' safety. Point out to your passengers the seat belt reminder, "Buckle Up—It's a Healthy Habit," and your personal resolution on your sun visor.

Polls show that almost all passengers would willingly put on their seat belts if only the driver would ask them.

11



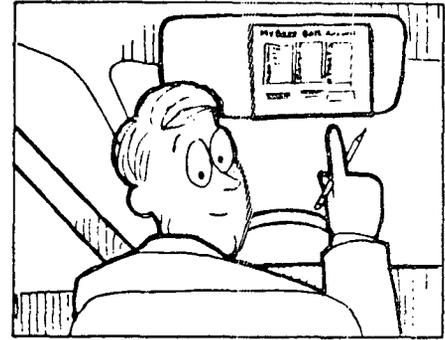
Record-keeping

Practice makes perfect . . .

Every habit and skill you now have bears out the truth of this old saying. But—how long does it take to form a habit—to be able to do something “automatically”? Authorities indicate that a habit must be practiced for a minimum of 21 days! 21 consecutive days of practice is enough to “program” yourself and condition your nerves and muscles for the “new habit” actions.

In this Plan you are asked to chart your seat belt use for 21 days on “My Seat Belt Record.” Try it and learn to use this time-tested formula to your advantage—and good health!

Don't allow yourself to become discouraged if you forget at first. Use that as a chance to think about *why* you forgot. Keep on practicing (in this case wearing your seat belts) for a minimum of 21 days—without question or judgement. It takes 21 days to form a new habit. You will be amazed at what you accomplish in just **21 days!**



Directions for attaching the Plan to your sun visor

To help you develop the seat belt habit, this Plan is made to fold over the lower edge of your sun visor. Fold the Plan so that your resolution/reminder “Buckle Up—It's a Healthy Habit” is on one side and your “My Seat Belt Record” is on the other.

Install the Plan so that “Buckle Up—It's a Healthy Habit” faces you when the visor is up and “My Seat Belt Record” is toward you when the visor is down. Keep a pen or pencil attached to aid your record-keeping.

How to use your seat belt record

Let's practice charting a sample day.

Use one of these symbols for every trip you take in a

car: ○ = trip without seat belt

⊙ = trip with seat belt

⊕ = trip with seat belt and asked other passengers to buckle-up

Habit Day	Write in Day of Week	Seat Belt Use Record
1		

In the boxes above, write in the day of the week and the correct symbol for each trip under "Seat Belt Use Record."

See correct answers on "My Seat Belt Record."

Let's say charting begins TODAY and the following car trips are taken:

1. Leave work for lunch alone in your car — you remember to buckle up.
2. Drive back to work, offering a co-worker a ride — you buckle up and ask co-worker to do the same.
3. Drive home from work — forget to buckle up at first; stop at grocery, then remember to buckle up rest of way home (HINT: count as two trips).
4. Take family (or friend) to a movie. Passengers notice "Buckle Up—It's a Healthy Habit" on visor. You buckle up and ask all riders to do the same.
5. Drive home from movie — everyone buckles up without being reminded.

The next time you go to your car:

- put this Plan on your sun visor
- buckle up, and
- log in

APPENDIX E

RESULTS OF STATISTICAL ANALYSES

- Exhibit E-1 Experimental Group Interactions in Pennsylvania
- Exhibit E-2 Experimental Group Interactions in Illinois
- Exhibit E-3 Experimental Group Interactions in Arizona
- Exhibit E-4 Experimental Group Interactions in California
- Exhibit E-5 Safety Belt Use Differences by Time of Observation

Exhibit E-1

EXPERIMENTAL GROUP INTERACTIONS IN PENNSYLVANIA

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 2	Screening	1.63	14.67*	8.34*
2 to 3	Counseling	6.57*	19.0*	0.02
3 to 4	Residual	0.59	21.92*	14.14*

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 3	Screening and Counseling	7.34*	1.29	4.86
2 to 4	Counseling and Residual	4.94	0.58	6.14*
1 to 4	Screening, Counseling, and Residual	5.79	17.25*	14.58*

*Indicates significant difference at the 0.05/k level of significance, where k is the number of tests in the analysis.

Exhibit E-2

EXPERIMENTAL GROUP INTERACTIONS IN ILLINOIS

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 2	Screening	--	5.92*	--
2 to 3	Counseling	--	8.64*	--
3 to 4	Residual	--	0.25	--

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 3	Screening and Counseling	--	17.46*	--
2 to 4	Counseling and Residual	--	1.73	--
1 to 4	Screening, Counseling, and Residual	--	6.11*	--

*Indicates significant difference at the 0.05/k level of significance, where k is the number of tests in the analysis.

Exhibit E-3

EXPERIMENTAL GROUP INTERACTIONS IN ARIZONA

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 2	Screening	--	3.37	6.42*
2 to 3	Counseling	--	18.40*	9.56*
3 to 4	Residual	--	--	--

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 3	Screening and Counseling	--	4.20	16.33*
2 to 4	Counseling and Residual	--	--	--
1 to 4	Screening, Counseling, and Residual	--	--	--

*Indicates significant difference at the 0.05/k level of significance, where k is the number of tests in the analysis.

Note: Delayed post counseling safety belt observations were not conducted.

Exhibit E-4

EXPERIMENTAL GROUP INTERACTIONS IN CALIFORNIA

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 2	Screening	--	--	0.01
2 to 3	Counseling	--	--	0.31
3 to 4	Residual	--	--	--

<u>Time Periods</u>	<u>HRA Component(s) Tested</u>	<u>Chi Square Value for Group Comparison</u>		
		<u>HRA Only and HRA with Education</u>	<u>HRA with Education and Control</u>	<u>HRA Only and Control</u>
1 to 3	Screening and Counseling	--	--	0.36
2 to 4	Counseling and Residual	--	--	--
1 to 4	Screening, Counseling, and Residual	--	--	--

*Indicates significant difference at the 0.05k level of significance, where k is the number of tests in the analysis.

Note: Delayed post counseling safety belt observations were not conducted and HRA with education was not tested.

Exhibit E-5

SAFETY BELT USE DIFFERENCES BY TIME OF OBSERVATION

<u>Time of Observation</u>	<u>Chi Square Value for Field Test</u>			
	<u>Pennsylvania</u>	<u>Illinois</u>	<u>Arizona</u>	<u>California</u>
1 (Baseline)	2.90	17.90*	0.52	1.11
2 (Post-Screening)	18.90*	0.16	1.80	0.79
3 (Post-Counseling)	15.70*	3.16	5.84	1.23
4 (Delayed Post-Counseling)	29.70*	1.22	--	--

*Indicates significant difference at the 0.05/k level of significance, where k is the number of tests in the analysis.

Note: Delayed post counseling safety belt observations were not conducted in Arizona and California.